In 2014 the directing body of the Institute of Cosmos Sciences was renovated. I was honored to be elected its Director, along with Vice Director Dra. Francesca Figueras and Secretary Dr. Bartomeu Fiol.

I would like to use these lines to gratefully acknowledge Dra. Figueras and Dr. Fiol for the invaluable help and support they offered me from the very beginning. I would also like to express my deep gratitude to our former Director Dr. Eduard Salvador and to our current Scientific Director Dr. Josep Maria Paredes, for laying the foundations that allowed our Institute to be recognized as a Center of Excellence. The joint effort of all ICCUB members has enabled the institution to be awarded in 2015 the distinction Unidad de Excelencia Maria de Maeztu in the first call organized by the Ministry of Economy and Competitiveness (MINECO).

Since 2011 the ICCUB has been participating in the successive calls of the Severo Ochoa program for Spanish Research Centers/Units of Excellence, obtaining an increasingly high score over time. It was in 2014 when a new modality named Maria de Maeztu was announced in order to have a specific, better suited call for centers and institutions that belong to universities. The requisites, required levels, demands and procedures of evaluation set by the Ministry were exactly the same as for the previous Severo Ochoa calls. In this first edition of the Maria de Maeztu call organized at the end of 2014, the ICCUB finally received the distinction of belonging to the reputable group of Units of Excellence.

This award represents an important recognition to the hard work done so far, and it is a unique opportunity to enhance the research conducted at the Institute and to take it to higher levels of excellence. It is now our responsibility to properly use this recognition and the additional financial support associated to it in order to increase our scientific achievements during the next four years.

Lluis Garrido Beltran
Director
The Institute of Cosmos Sciences of the University of Barcelona (ICCUB) is an interdisciplinary center which is devoted to fundamental research in the field of cosmology, as well as to the technological applications of the sciences of the cosmos in general. It gathers researchers from the departments of Astronomy and Meteorology, Structure and Constituents of Matter, Fundamental Physics, Applied Mathematics, Organic Chemistry and Electronics.

It was created in 2006 as the instrument of the University of Barcelona for the active support of research in these fields, paying special attention to their synergies, as well as to promote experimental and instrumental activity, enabling a significant participation of the UB in large international collaborations, and to attract highly qualified scientific personnel.

ORGANIZATION CHART

Executive Board

Director: Lluís Garrido
Deputy Director: Francesca Figueras
Secretary: Bartomeu Fiol

Council of the Institute

Domènec Espriu
Bartomeu Fiol (Secretary)
Francesca Figueras (Deputy Director)
Lluís Garrido (Director)
Eugen Graugés
David Mateos
Simone Migliari
Jordi Miralda
Josep Maria Paredes
Àngels Ramos
Blai Sanahuja
Joan Soto

Scientific Board

Francesca Figueras (Deputy Director)
Bartomeu Fiol
Lluís Garrido (Director)
Ricardo Graciani
Simone Migliari
Josep M. Paredes (Scientific Director)

International Advisory Council

Felix Aharonian, Dublin Institute for Advanced Studies and Max Planck Institute für Kernphysik, Heidelberg (Chair)
Alan Heavens, Imperial Centre for Inference and Cosmology, Imperial College, London.
Slava Mukhanov, ASC, Physics Department, LMU, Munich.
2014 - THE ICCUB IN FIGURES

Staff

- 59 Permanent Staff
- 6 Ramon y Cajal Members
- 3 Juan de la Cierva Members
- 29 Postdoc Fellows
- 44 PhD Students
- 20 Engineers and Technicians
- 5 Services and Administration Personnel
- 11 Visiting Scholars

Projects and Funds

- 16 European Projects
- 3 Other international projects
- 35 National Plan & Consolider Projects
- 10 Consolidated Groups
- 13 Contracts with the industry
- 15 Other Funds

Publications

- 281 SCI Publications
- 44 Non SCI-Publications
- 95 Technical Reports

Theses

- 10 Finished PhD Theses
- 64 Ongoing PhD Theses
- 21 Finished Master Theses

Activities

- 7 ICCUB Colloquia
- 83 Group Seminars
- 9 Event Organization
- 40 Public Talks
- 4 Exhibitions

PROJECTS AND FUNDS 2014: BUDGET

For projects with an execution period of more than one year, only the proportional amount has been considered.
**Permanent Staff**

Canal, Ramon (UB)  
Centelles, Mario (UB)  
Crusats, Joaquim (UB)  
D’Enterria, David (ICREA, leave of absence)  
Diéguez, Ángel (UB)  
El-Hachemi, Zoubir (UB)  
Emparan, Roberto A. (ICREA)  
Espriu, Domènec (UB)  
Estalella, Robert (UB)  
Fabricius, Claus Vilhelm (IEEC)  
Fernández, José M. (UB)  
Fiol, Bartomeu (UB)  
Garrido, Lluís (UB)  
Garriga, Jaume (UB)  
Gómez, Gerard (UB)  
Gómez, Jose M. (UB)  
Gomis, Joaquim (UB)  
González, María Concepción (ICREA)  
Graciani, Ricardo (UB)  
Graugés, Eugeni (UB)  
Guasch, Jaume (UB)  
Guzmán, Rafael (UB & U. Florida)  
Iwasawa, Kazushi (ICREA)  
Jimenez, Raúl (ICREA)  
Jordi, Carme (UB)  
Latorre, Jose I. (UB)  
Llosa, Josep (UB)  
López, Rosario (UB)  
Luri, F. Xavier (UB)  
Magas, Volodymyr (UB)  
Manrique, Alberto (UB)  
Mateos, David (ICREA)  
Mescia, Federico (UB)  
Miralda, Jordi (ICREA)  
Molina, Alfred (UB)  
Núñez, Jorge C. (UB)  
Padoan, Paolo (ICREA)  
Parreño, Assumpta (UB)  
Polls, Artur (UB)  
Pons, Josep M. (UB)  
Ramos, Àngels (UB)  
Ribó, Josep M. (UB)  
Ribó, Marc (UB)  
Ruiz, Hugo (UB)  
Russo, Jorge G. (ICREA)  
Sala, Ferran (UB)  
Salvat, Francesc (UB)  
Sanahuja, Blai (UB)  
Solà, Joan (UB)  
Solanes, José M. (UB)  
Soto, Joan (UB)  
Taron, Josep M. (UB)  
Torra, Jordi (UB)  
Verdaguer, Enric (UB)  
Verde, Licia (ICREA)  
Viñas, Xavier (UB)

**Postdoc Fellows**

Àgueda, Neus  
Aliu, Ester  
Aran, Àngels  
Attems, Maximilian  
Balaguer, Dolores  
Bellini, Emilio  
Bergström, Johannes  
Carrasco, José M.  
Cuesta, Antonio José  
Fernández, Antón  
García, Miguel Ángel  
Gracia, Gonzalo  
Haibo, Qiu  
Kandu, Arnab  
Masana, Eduard  
Niro, Viviana  
Pantelidou, Christiana  
Portell, Jordi  
Roca, Santi  
Romero, Mercè  
Sestayo, Yolanda  
Simpson, Fergus Rae Goalen  
Tanabe, Kentaro  
Tarrio, Luis Javier  
Tywoniuik, Konrad  
Voss, Holger  
Weiler, Michael  
Zanin, Roberta  
Zilhao, Miguel

**Ramon y Cajal Members**

Bosch, Valentí  
Casalderrey, Jorge  
Iblisdir, Sofyan  
Julià, Bruno  
Mighari, Simone  
Notari, Alessio

**Juan de la Cierva Members**

Tarrio, Luis Javier  
Tywoniuik, Konrad  
Zanin, Roberta

**Visiting Scholars**

Andrianov, Alexander  
Ballesteros, Guillermo  
Casademunt, Jaume  
Jorba, Àngel  
Lizzi, Fedele  
Prieto, Joaquin

Ruiz, Josep Xavier
Ruiz, M. Pilar
Talavera, Pere
Torrelles, José María
Yun, Joao

PhD Students

Abedi, Hoda
Alsina, Daniel
Ariño, Andreu
Barranco, Alejandro
Camboni, Alessandro
Carbone, Arianna
Casamiquela, Laia
Cheng, Yu
Dector, Aldo
Di Dato, Adriana
Feijoo, Albert
Fröb, Markus
Gabbanelli, Luciano
Galindo, Daniel
Garolera, Blai
Gómez, Adrià
Gontcho A Gontcho, Sarya
González, Juan
Juan, Enric
Juárez, Carmen
Maneu, Jordi
Marcote, Benito
Marín, Carla
Mariño, Mauricio
Martinez, Marina
Mas, Lluís
Merino, M. Teresa

ENGINEERS AND TECHNICIANS

Antiche, Erika
Borrachero, Raúl
Casajús, Adrià
Casanova, Raimon
Casas, Albert
Castañeda, Javier
Clotet, Marcial
Comerma, Albert
Garralda, Nora
Gascón, David
González, Juan José
Julbe, Francesc
Mauricio, Joan
Molina, Daniel
Pérez, Gabriel
Picatoste, Eduard
Roma, David
Sabater, Josep
Sanuy, Andreu
Trenado, Juan

SERVICES AND ADMINISTRATION PERSONNEL

ICCUB Secretariat

Frutos, Ariadna
Moreno, Ana Belén

Group Support

Macduff, Kayla
Olarte, Surinye

Collaborating Students

Ortiz, Elisenda
Research at ICCUB, a center devoted to Cosmology, Particle Physics and Astrophysics, contributes to the most recent and relevant developments in the study of the Universe. It is conducted with the aim of answering some of the most intriguing and fundamental questions:

**What are the origin and fate of the Universe?**

An early phase of accelerated expansion of the Universe, known as inflation, not unlike the one currently taking place due to dark energy, seems a strong possibility. Are these two phenomena related? Can they be derived from a fundamental theory?

**Which are the ultimate constituents of the Universe?**

Dark matter apparently accounts for most of the matter density of the universe, but it cannot be accommodated within the currently accepted Standard Model of Particle Physics. What is dark matter, and how could the Standard Model be extended to accommodate it?

**Why does the Universe have its present appearance?**

The accelerated flat cold dark matter Universe model is in good agreement with the large-scale properties of the Universe, but its associated hierarchical galaxy formation scenario seems to be in contradiction with various galaxy properties. Is there something wrong with the models of galaxy formation? Is dark matter warm instead of cold?

These questions reveal the intimate connection between particle physics and astrophysics and therefore demand a multidisciplinary approach. Research at ICCUB intends to tackle them from the theoretical, observational and experimental viewpoints.

The main areas of research at ICCUB are:

- Cosmology and Large Scale Structure.
- Experimental Particle Physics.
- Galaxy Structure and Evolution.
- Gravitation and Cosmology.
- High Energy Astrophysics.
- Nuclear and Hadron Physics.
- Particle Physics Phenomenology.
- Star Formation.
- Theoretical Physics.
- Additional lines of research.

These areas are complemented with the following transversal technological lines:

- Electronic and Instrumentation Development.
- Very Large Data Processing and Analysis.

Which induce large participation in:

- Knowledge Transfer and Innovation.

Research in particle physics and astrophysics involve the use of data collected by means of sophisticated instrumentation that cannot be afforded by individual research centres. ICCUB researchers are currently participating in the following projects:

- **Space Missions:** Gaia, Euclid, Solar Orbiter, COroE.
- **Ground-based observatories and telescopes:** Sloan Digital Sky Survey (SDSS), Large Synoptic Survey Telescope (LSST), MAGIC Cherenkov Telescopes, Cherenkov Telescope Array (CTA), Dark Energy Spectroscopic Instrument (DESI), CAHA, ORM.
- **Accelerators and particle detectors:** LHCb detector, BABAR detector, SuperB detector.
One of the main interests at ICCUB is the study of the connection between cosmological observations and the physics behind the standard cosmological model. This research effort aims at answering the big open questions of modern cosmology: what makes up the Universe? What is dark matter? What is dark energy? What powered inflation? What lights up the Universe? In the Cosmology and Large Scale Structure group researchers follow both a theoretical and observational approach.

Activity 2014

The SDSS3 survey finished data taking, data releases 10 and 11 were made public along with their cosmological interpretation. New measurements of the BAO (baryon acoustic oscillations) scale from Lyman-α forest correlations were published. ICCUB researchers also focused on measurements of average metal line strengths of DLAs and correlations of MgII absorbers with galaxies using the BOSS data. The theory of the non-linear effects and the impact of radiation fluctuations on the Lyman-α forest power spectrum was also developed.

The implications of the latest cosmological observations for neutrino properties (neutrino mass scale and number of effective species) were elucidated. Current data do not imply non-standard neutrino properties and tightly constrain deviations from these.

The cosmic distance ladder, traditionally interpreted as a way to measure local distances using as intermediate rungs supernova and baryon acoustic oscillation distance measurements. Moreover, current data on cosmic distances are powerful enough to allow one to drop the general relativity (GR) assumption and still measure the universe expansion history, the universe geometry, and constrain early Universe physics and neutrino properties. We only have to assume the copernican principle, metric theory of gravity, a smooth expansion history and the existence of standard rulers (baryon acoustic oscillations), candles (supernovae) and clocks (early type galaxies). Even without GR the Universe looks a lot like LCDM.

Finally, it was also shown that gamma ray bursts might be responsible for past extinctions on Earth, and for limiting the possibility of life on planets near the center of galaxies.
ICCUB’s experimental particle physicists are specialized in the study of flavo...r c quarks. Currently the group is fully involved in LHCb experiment data analysis and on its upgrade project.

The LHCb detector, one of the four detectors of the Large Hadron Collider (LHC) in CERN, is designed to study this asymmetry through the b and anti-b particle pairs produced in proton collisions. The ICCUB, aside from its participation at a scientific level, undertook the design, production and installation of the electronics of the SPD (Scintillator Pad Detector) part of the calorimeter, and participated in the development of the Worldwide LHC Computing Grid (WLCG) computer network and the DIRAC software.

An updated LHCb detector is currently being designed and scheduled for 2018 to start operation. ICCUB researchers participate in the design of the readout electronics of both the calorimeter and the new central tracker, which will be based on scintillating fibers.

**Activity 2014**

In 2014 the research has focused on study of the radiative B meson decays in the LHCb experiment. This kind of decays offer a unique exploration window to look for new physics beyond the Standard Model (SM) by precisely measuring the photon polarization of such decays, analyzing either the B meson decay time or the angular distribution of its decay products. Moreover, the ICCUB has contributed to the design and development of the readout (RO) electronics for the calorimeter and the Scintillating Fiber Tracking of the LHCb experiment upgrade. The cross-application of the LHCb-generated knowledge in photo-sensor RO electronics has generated several service contracts with semiconductor companies and several medical applications (PET devices). Improvements in the DIRAC software have also been made. See sections *Electronic and Instrumentation Development* and *Very Large Data Processing and Analysis* for more information.
Gaia is an important world-class scientific mission that will provide fundamental data for almost all fields of Astrophysics. The satellite was successfully launched on 19th Dec 2013. Gaia is designed to provide key information on the formation and evolution of our Galaxy. At present, the research in Galactic Astronomy at the ICCUB is highly influenced by the preparation of the scientific exploitation of this mission, in which ICCUB researchers are deeply involved (see Very Large Data Processing and Analysis section). Research at the ICCUB includes galaxy modelling, the study of stellar constituents and stellar luminosity calibration. Members are also devoting their efforts to address the very complex process of galaxy formation and to explore the broad dynamical range of parameters that govern the physics of matter interactions. ICCUB members coordinate the Red Española de Explotación Científica de Gaia and are active members of the international networks created for the scientific exploitation of Gaia.

Activity 2014

New tools for the scientific exploitation of Gaia—innovative and far from traditional— have been proposed. Furthermore, ICCUB members take part of the Gaia-ESO survey, the Open Clusters OCCASO survey and the WEAVE@WHT consortium to complement Gaia data with high-resolution spectroscopy from ground. ICCUB members have also been working in the definition of synergies with large present and future surveys. Work developed in Galaxy modelling include, among others, the characterization of the central bar, the development of novel methods to unveil the nature of the spiral structure and a new kinematic model to describe the galactic warp. High-resolution cosmological N-body with hydrodynamics simulations for Milky Way like galaxies has allowed to provide new insights in the disk large scale structures and baryonic content. Work done in the characterization of the Milky Way constituents has been, among others, the astrometric and photometric analysis of open clusters and the first detection of the stellar and dust over-densities associated to the Perseus arm. The team has been working in the characterization of low-mass stars activity, in the improvement of robust statistical tools for the stellar luminosity calibration, new planetary nebulae detection and binarity. The availability of the Gaia Object Generator (GOG) has now been used for scientific analysis and work is in progress to continuous improving the Besançon-Barcelona Population Synthesis Galaxy Model. Besides, by means of controlled collisionless simulations of the pre-merger stage of galaxy groups, it has been possible to demonstrate that the multiple mergers that take place during the hierarchical build-up of these systems are able to create fully realistic first-ranked galaxies, without the additional consideration of a dissipative component.
ICCUB researchers carry out research in the areas of gravity and the gauge/gravity correspondence.

In the area of gravity, research is focused on the study of black holes in string theory and in higher-dimensional spacetimes, inflationary models and quantum gravity in de Sitter spaces.

In the area of gauge/gravity correspondence the ICCUB is devoted to the study of the quark-gluon plasma and the computation of observables in gauge theories.

Activity 2014

The 2014 activity in gravitation and cosmology can be divided in three main areas:

Gravity and Black Holes: ICCUB researchers have developed the inverse-dimensional expansion for black holes, solving for quasinormal spectra and instabilities of rotating black holes. They have also investigated numerically the properties of six-dimensional black holes with bumpy horizons.

Holography: Holographic collisions have been studied, and it has been shown how they can be efficiently computed by linearizing Einstein’s equations around the final equilibrium state. A holographic model for longitudinal coherence in heavy ion collisions has also been developed. ICCUB researchers have combined the AdS/ CFT duality and supersymmetric localization to make exact predictions for string perturbation theory.

Cosmology: ICCUB researchers have extended their research about the effects of bubble nucleation and tunnelling transitions in multiverse models. They have explored the possibility that the wave function of an inflationary universe is given by the partition function of a dual quantum field theory. The stability of de Sitter space including vacuum polarization effects has been analyzed. ICCUB researchers have also investigated the possibility of realizing Inflation using the Higgs field in a metastable vacuum in non minimal gravity models and in extensions of the Standard Model.
A general aim of ICCUB researchers working on this field is to achieve a better understanding of the high energy galactic sources, gathering data over a large wavelength range (from radio to TeV energies) as well as modeling emission processes in different scenarios (jets, shocks, interaction with the interstellar medium, etc.).

In particular, ICCUB researchers are interested in the study of microquasars, as objects which exhibit the characteristic accretion disc and perpendicular jets of relativistic matter of quasars, both thereby being governed by essentially the same physical processes as well as being subject to a timescale which is much more amenable to observations. They are also interested in the study of gamma-ray binaries, which are able to accelerate particles up to TeV energies. Moreover, the ICCUB high energy astrophysicists are members of the MAGIC Collaboration since February 2006, and are currently participating, together with experimental physicists and engineers from the ICCUB, in the Cherenkov Telescope Array (CTA) project, an initiative to build the next generation of ground-based gamma-ray instrument.

### Activitiy 2014

Research in High Energy Astrophysics has been focused on observations, theoretical modelling and numerical simulations to understand the physics of astrophysical outflows. Semi-analytical and numerical calculations of the radiation processes taking place in the sources have been developed to enable predictions of observable features in the different scenarios under investigation (small and large scales, galactic and extragalactic sources of outflows), which can be tested observationally. In another line, multi-wavelength observations of MWC 656, the first Be/black hole system, have revealed its X-ray counterpart and allowed to predict that the radio/X-ray correlation found in black hole Low Mas X-ray binaries might also be valid for black hole High Mas X-ray binaries. In addition, it has been revealed the coupling between the thermal and non-thermal processes in the gamma-ray binary LSI+61303. Finally, there have been improvements on the knowledge of absorption mechanisms and on wind mixing in gamma-ray binaries through low frequency observations with LOFAR and GMRT.
Research in this field included the theoretical description of hadronic systems with strangeness and/or charm in the vacuum, in nuclear matter, and in the hot medium generated in relativistic heavy ion collisions; the investigation of the structure of hypernuclei and exotic nuclei far from the valley of stability, the equation of state in nuclear matter and its role in the description of neutron stars, and the modeling and numerical study of the interaction of electrons, photons and ions with matter. ICCUB researchers have also obtained information on the interaction among baryons by solving numerically the underlying theory of the strong force, Quantum Chromo Dynamics, in finite volume. Their research has a direct connection with experiments, either with the programs at world leading physics laboratories (BNL, CERN, ELSA-Bonn, Fz-Jülich, GSI, GANIL, JLAB, JPARC, MAMI-Mainz, RIA and RIKEN) or with astronomical observational data coming from the new generation of X-ray and gamma-ray space observatories, which supply important information about compact stars. Recently, they have directed an important part of their efforts to the study of ultra-cold atomic gases and Bose-Einstein condensates.

**Activity 2014**

1. Analysis of the values of neutron star radius obtained by performing a global microscopic description of a neutron star, from the core to the crust.
2. Study of the nuclear symmetry energy and identification of observables which can constrain different aspects of this energy, as its density dependence.
3. Study of symmetric and asymmetric nuclear matter, including pure neutron matter, using the self-consistent Green’s function method. We have determined the isospin dependence of the momentum distribution, and the formalism has been extended to include three-body forces.
4. Study of strangeness –2 systems through the description of the kaon-induced production of Ξ–hyperons using a chiral Lagrangian up to next-to-leading order, and the theoretical description of the strong and weak decay of ΛΛ-hypernuclei.
5. First results for the magnetic moments of light nuclei from LQCD calculations.
7. Analysis of quantum phenomena which appear when placing bosons in optical lattices.
8. Determination of the complete phase diagram for one-dimensional binary mixtures of bosonic ultracold atomic gases in a harmonic trap.
9. Study of the properties of three bosons in a one-dimensional parabolic trap at zero temperature.
The ICCUB has a wide spectrum of interests in the phenomenological and calculating aspects of Particle Physics, covering many aspects of the areas reported in the hep-ph, hep-th and hep-lat archives.

The composition of the group reveals this variety of interests, extending to many of the forefront areas of research in Particle Physics. Several members share their activity in phenomenological aspects with their work in more formal parts of theoretical physics and gravitation. Furthermore, they have an ever growing interest in the cosmological and astrophysical implications of particle physics phenomenology.

There is also a considerable overlap of interests in the area of b-physics and the Experimental Particle Physics group members from the LHCb experiment.

**Activity 2014**

The activity has been influenced to a large extent by the first LHC results. Studies in this area are being focused on effective theories from the symmetry breaking sector of the Standard Model, some aspects of supersymmetric theories, string phenomenology, flavour physics (particularly b-physics) and physics beyond the standard model that the LHC will continue exploring in the years to come. ICCUB members are also sharpening their theoretical tools to take adequate stock of the next three years of running starting in spring 2015. They are also preparing for possible new experimental projects now under discussion.

In the area of b-physics ICCUB researchers have continued their pioneering studies of possible new observables and angular distributions that might reveal the presence of new physics.

Effective theories of QCD, especially in the heavy quark sector are being intensively studied by ICCUB researchers. These include resummation techniques and jet physics.

Several features of heavy ion collisions particularly in the domain of hard probes and the study of properties of QCD under extreme conditions have also received considerable attention during 2014. Activity in the study of the behaviour of jets in quark-gluon plasma has been significant, including studies from holographic QCD.

QCD-related research includes work on lattice field theory, specially in connection with b-physics. ICCUB researchers also have relevant activity in the development of parton distribution functions using neural networks.

Relevant contributions are also being made in the field of neutrino physics, axion physics and other dark matter candidates as well as dark energy in contact with the cosmology and astrophysics groups. ICCUB particle physics phenomenologists have close interactions with the experimental particle physicists at the ICCUB and with researchers in other theoretical areas.
**3. RESEARCH ACTIVITY**

### STAR FORMATION

#### LINES OF RESEARCH
- High-angular-resolution observations of the first stages of stellar evolution.
- Outflows, jets, and accretion disks in young stellar objects, and jets in planetary nebulae.
- Computational models of star-forming regions, from large-scale SN-driven turbulence to individual stars.

#### ICCUB MEMBERS
Estalella, Robert • Juárez, Carmen • López, Rosario • Padoan, Paolo.

#### VISITING SCHOLARS
Torrelles, José María • Yun, Joao.

ICCUB research in this field focuses on the investigation of the dynamics of star-forming regions in our Galaxy and on the study of the first stages of stellar evolution. ICCUB researchers intend to acquire a perspective as wide as possible by pursuing both an observational approach, ranging from the optical to the radio domain, and a theoretical approach, based on state-of-the-art supercomputer simulations of the evolution of star-forming regions. Observations and simulations are compared through the generation of synthetic observations of the simulations.

Specific areas of research include the characterization of the role of the magnetic field in the star formation process and in the launching and collimation of the astrophysical jets associated with young stellar objects and planetary nebulae; the investigation of the early stages of the formation of massive stars; the search for signatures of planet formation within the protoplanetary disks; the study of the transition from hot molecular cores to bright HII regions; the numerical modeling of the turbulent fragmentation process to understand the origin of the stellar initial mass function and the star formation rate in molecular clouds; the numerical modeling of the ISM on very large scale to study the role of supernova explosions in the driving of the ISM turbulence and in the formation and disruption of giant molecular clouds.

#### Activity 2014

The observational study of fragmentation in high-mass star-forming regions has been continued with high angular resolution observations of the 1.3 mm continuum emission carried out with the Submillimeter Array (SMA) toward two hubs, G14.2-hub-N and G14.2-hub-S, in the Infrared Dark Cloud G14.225-0.506 together with observations of the dust emission at 870 and 350 μm obtained with APEX and the CSO single-dish telescopes. It has been studied the density structure of the two hubs by means of a simultaneous fit of the radial intensity profile at 870 and 350 μm and the spectral energy distribution. It was also investigated the interplay between magnetic field, turbulence, gravity and UV radiation feedback.

The numerical study of star-forming regions has resulted into the largest star-formation simulation to date (several million core hours on the NASA/Ames Pleiades supercomputer), where a 4-pc region has been followed for over 3 Myr, describing the formation of 1300 stars, with masses ranging from brown dwarfs to massive stars. Both the stellar mass distribution and the star formation rate are in excellent agreement with the observations. This simulation has been used to solve the long-standing luminosity problem, meaning the origin of the characteristic luminosity (and the large luminosity spread) of protostars.

### THE INITIAL PHASES OF MASSIVE STAR FORMATION

**Overview of the large scale structure of the G14.2 complex.**
White contours represent the 3σ contour level of the NH$_3$ (1,1) integrated intensity map. The NH$_3$ synthesized beam is shown in the bottom left corner. Color scale is the 8μm Spitzer image. Red stars indicate IRAS sources in the field, and pink crosses mark the position of H$_2$O masers. Color stars depict the positions of YSOs with colors indicating their evolutionary stage. The SMA field of view of the two regions mosaiced, hub-N and hub-S, are indicated in green.
ICCUB activities cover a wide spectrum of areas reported in the hep-th and quant-ph archives. Many ICCUB researchers are active in varying proportions in these areas.

String theory has inspired in recent times enormous activity in the gauge/string duality conjecture that allows a treatment of several types of strongly coupled theories in terms of gravity duals.

Supersymmetric field theories are studied seeking to understand the ultraviolet behavior of theories with extended supersymmetries and deriving exact results.

Research in quantum information is quite active too focusing in several topics such as entanglement entropy, tensor networks, quantum error correction, many-body quantum systems, topological order; ultra-cold gases; and quantum simulation.

The quantum information researchers at the ICCUB are in close collaboration with some of the groups at ICFO.

Activity 2014

A very active research line at ICCUB concerns exact results in nonabelian gauge theories. Using supersymmetric localization, matrix integrals and resurgence techniques, various aspects of supersymmetric gauge theories in three and four dimensions have been studied, including quantum phase transitions and vacuum expectation values of Wilson operators.

ICCUB researchers have used the AdS/CFT duality to study various Yang-Mills theories at finite heavy-quark density and their renormalization group flows.
The additional areas of research at ICCUB are:

- Astrodynamics and Celestial Mechanics.
- Astronomical Image Processing and High Angular Resolution Techniques.
- Chirality and Prebiotic Chemistry.
- Heliospheric Physics and Space Weather.
- Microgravity and Biphasic Fluxes.

**ASTRODYNAMICS AND CELESTIAL MECHANICS**

ICCB researchers on Astrodynamics are devoting their efforts to addressing some fundamental issues concerning: the problems related to orbit and attitude control in formation flying of swarms of spacecraft; the development of some dynamical indicators to determine regions and structures that separate different dynamic regimes in autonomous and non-autonomous dynamical systems; the optimal transfer to polar orbits around the Moon; the analysis of the phase space in the vicinity of an irregular asteroid; the study of mass transport mechanisms in the Solar System.

**Activitiy 2014**

During 2014 ICCUB researchers have focused they research in four main topics.

First, they have continued with their activities related to the end of life disposal of spacecraft at the libration point regions.

Second, they worked on the computation of Lagrangian Coherent Structures for the determination of invariant manifolds and long-term stability regions in Celestial Mechanics and Astrodynamics.

In third place, in collaboration with CNES, they have continued their research plan about parameter identification of space debris and accurate estimation of collision probabilities.

Lastly, ICCUB researchers have continued their research in spacecraft formation flight control based both on behavioural and minimum relative radial accelerations structures.

**ASTRONOMICAL IMAGE PROCESSING AND HIGH ANGULAR RESOLUTION TECHNIQUES**

- Image deconvolution by means of multi-resolution analysis (wavelet and curvelet transform).
- Image fusion and super-resolution by means of multi-resolution analysis (wavelet transforms).
- Application of Image deconvolution to Space Debris observation.
The group on Image Processing is focused on the use of the wavelet and curvelet transforms to improve the ability of image sensors to detect faint stars and moving objects. Applications to Astronomy and Remote Sensing are developed. The group is studying the effects of the curvelet transform over interferometric images and the effect of deconvolution (using wavelets and curvelet-based maximum likelihood estimator) in adaptive optics observations. ICCUB researchers are also working on obtaining super-resolution using additive-substitutive wavelets techniques on remotely sensed images.

**Activitiy 2014**

During year 2014 the main activities were focused on the application of deconvolution to increase the limiting magnitude of images obtained for space debris detection. Activities of the group were also devoted to the continuation of the study of the deconvolution by multiresolution of images obtained using adaptive optics and the comparison of classical, myopic and blind algorithms. Studies of image fusion and superresolution also continued.

### CHIRALITY AND PREBIOTIC CHEMISTRY

**LINES OF RESEARCH**

- Effect of mechanical forces (flows with gradient of shear rates) on the emergence of chirality in soft matter.
- Mirror symmetry breaking in crystallizations and aggregations showing critical phenomena.

**ICCUB MEMBERS**

Crusats, Joaquim • El-Hachemi, Zoubir • Ribó, Josep M.

The experimental expertise in this area is the study of the stereo and enantioselective effect of hydrodynamic flows in the formation of supramolecular systems by self-assembly as well as the phase transitions from achiral building blocks to chiral supramolecules. The substances under research are amphiphilic porphyrins. The general objective of these works is the understanding of unusual chiral polarizations in the spontaneous emergence of chirality during the chemical evolution that eventually lead to living systems. This implies the definition of thermodynamical scenarios in applied chemistry where such a transition to chirality is possible.

**Activitiy 2014**

The theoretical discussion of experimental results on spontaneous mirror symmetry and their concordance with possible Earth prebiotic scenarios has been reported. Specific efforts have been made and partially reported in the discussion of chemical scenarios to justify, in the frame of linear thermodynamics of irreversible processes, a bias from the racemic composition in the absence of any external chiral polarization.

### HELIOSPHERIC PHYSICS AND SPACE WEATHER

**LINES OF RESEARCH**

- Solar energetic particle (SEP) events, interplanetary shocks and related solar activity.
- Modeling gradual proton events: magnetohydrodynamic shock simulations plus particle transport simulations and applications.
- Modeling near-relativistic electron events: inversion methods and applications.
- Space weather: Engineering models for prediction of peak flux and fluences of solar energetic particle events.

**ICCUB MEMBERS**

Àgueda, Neus • Aran, Àngels • Sanahuja, Blai.
ICCUB’s lines of research in Heliospheric Physics mainly focus on solar energetic particle (SEP) events triggered by solar activity and by interplanetary disturbances, i.e. energetic protons and near relativistic electrons. Solar flares and coronal mass ejections, the main agents of SEP-acceleration, together with proxies of solar activity, the solar wind plasma and the interplanetary magnetic field, are the background components of the SEP scenario. In this context, ICCUB researchers are working both on data analysis and the study of SEP events, both individual and multispacecraft events. They also model energetic particle events and give scientific support to the participation of technological groups of the UB in ESA’s Solar Orbiter project (see section Electronic and Instrumentation Development).

**Activitiy 2014**

In 2014 ICCUB researchers studied the timing and duration of the release processes of seven near relativistic electrons (~0.5c) in the low corona using in situ measurements by both the ACE and the Wind spacecraft and context electromagnetic observations in soft and hard X-rays, radio and white light. The estimate release time has been compared with the results obtained by using a simulation to unfold the interplanetary transport effects.

ICCUB researchers also studied the variation of the shape of the proton intensity–time profiles in gradual SEP events with the relative observer’s position in space with respect to the main direction of propagation of an interplanetary shock (heliolongitude and heliolatitude). A three-dimensional magnetohydrodynamic code was used to simulate such a shock and the evolution of the downstream-to-upstream ratios of the plasma variables at its front were determined. This is the first time that the latitudinal dependence of the flux proton peak intensity with the observer’s heliocentric radial distance has been quantified, within the framework of gradual SEP event simulations.

The three-year collaborative project SPACECAST, FP7-SPACE programme of the European Union, came to an end.

**MICROGRAVITY AND TWO-PHASE FLOWS**

<table>
<thead>
<tr>
<th>LINES OF RESEARCH</th>
<th>VISITING SCHOLARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Dynamics of turbulent bubble flows in microgravity.</td>
<td>Casademunt, Jaume</td>
</tr>
<tr>
<td>■ Controlled boiling in microgravity.</td>
<td>Ruiz, Josep Xavier.</td>
</tr>
</tbody>
</table>

In recent years, ICCUB’s visiting scholars have been consistently studying the formation and management of small bubbles under microgravity conditions, in particular in the context of turbulent flows, an area of fundamental interest in multiphase flows and with important applications in space technology, from life support systems to thermal control of space vehicles.

Experiments are conducted in the European Space Agency (ESA) Drop Tower facility at ZARM (Bremen, Germany). The use of the tower is supported by ESA and the research is financially supported by the US Air Force Office of Scientific Research (USA) through the European Office of Aerospace Research and Development. The main objective is to elucidate physical mechanisms that control bubble formation, bubble-flow interactions, and heat exchange in the absence of gravity, in view of improving current designs and searching for new strategies for efficient thermal control in microgravity environments.

**Activitiy 2014**

In 2014 the activity has focused on the optimization and characterization of an innovative design for capillary boiling through controlled localized nucleation. The prototype system has proven to work robustly in a gravity-insensitive way and has been fully characterized within a variety of relevant parameters. The device generates regular slug flows that can be used as input for heat-exchange or other devices.

The series of 64 drops in the ZARM Drop Tower facility has been completed. Based on the results obtained, a new design has been proposed for controlled capillary boiling on a (passive) self-sustained closed-loop system.

On the theoretical side, an idealized version of the nucleation device has been solved exactly showing interesting scaling properties of fundamental interest.
ICCUB is currently participating in the development of the following electronics and instrumentation:

**Electronics for CTA, LHCb and PET**

ICCUB members have more than ten years of experience in the design of instrumentation and radiation-tolerant application-specific integrated circuits (ASICs) for high-speed photodetectors like photomultiplier tubes (PMTs) or Silicon photomultipliers (SiPM, MPPC, GAPDs, etc.). Nowadays they are working in different ASICs for the Cherenkov Telescope Array (CTA), in the design of an ASIC for the calorimeter and the new Scintillating Fiber Tracker of the upgraded LHCb, and in the development of ASICs for new PET (Positron Emission Tomography) systems based in silicon photomultipliers.

**MIRADAS**

The ICCUB is responsible of the MIRADAS project of the Gran Telescopio de Canarias (GTC). The basic MIRADAS concept is a near-infrared multi-object echelle spectrograph operating at spectral resolution $R=20,000$ over the 1-2.5µm bandpass. MIRADAS selects targets using ~20 deployable probe arms with pickoff mirror optics, each feeding a 4.0x1.2-arcsec field of view to the spectrograph. The spectrograph input optics also include a slit slicer which reformats each probe field into 3 end-to-end slices of a fixed 4.0x0.4-arcsec format – combining the advantages of minimal slit losses in any seeing conditions better than 1.2-arcsec, while at the same time providing some (limited) two-dimensional spatial resolution. The spectrograph optics then provide a range of configurations providing the observer with the ability to choose between maximal multiplex advantage and maximal wavelength coverage, with several intermediate options, depending upon the needs of the science program.

**Solar Orbiter**

The ICCUB is part of the Polarimetric and Helioseismic Imager instrument for the Solar Orbiter mission (SO/PHI). The ICCUB responsibility is the development and implementation of an Image Stabilization System (ISS) that includes a camera, a controller for a piezo-electric based Tip-Tilt mirror, and the control firmware for the FPGA that controls the whole system. The ISS has been optimized to minimize the power consumption and to provide the best performance making use of the reduced number of parts available for space applications.

**Montsec Astronomical Observatory**

ICCUB researchers are working since more than ten years ago in the Telescope Fabra-ROA Montsec (TFRM) located at the Observatori Astronomic del Montsec (OAdM). The TFRM is a 0.5m aperture f/0.96 optically modified Baker-Nunn Camera, which offers a unique combination of instrumental specifications: fully robotic and remote operation, wide-field of view (4.4°x4.4°), moderate limiting magnitude (V=19.5 mag), ability of tracking at arbitrary right ascension and declination rates, as well as opening and closing CCD shutter at will during an exposure. Nearly all kind of image survey programs can benefit from those specifications. Apart from other less time consuming programs, since the beginning of science TFRM operations, ICCUB researchers have been conducting two specific and distinct surveys: super-Earths transiting around M-type dwarfs stars and geostationary debris in the context of Space Situational Awareness / Space Surveillance and Tracking (SSA/SST) programs. In parallel other programs as the search for near earth objects (NEO) and the observations of high energy sources are carried out regularly.
Activitiy 2014

Electronics for CTA, LHCb upgrade and PET

Regarding CTA, in 2014 three ASICs developed in 2013 have been successfully tested: PACTAv1.4 (a wideband 16 bit dynamic range current mode PreAmplifier), ACTAf 2Ch F (a wideband pulse amplifier for NECTAr chip) and TL0R1 (a versatile ASIC for L0 triggering in Cherenkov Telescopes). PACTA and TL0R will presumably be used in the Large Size Telescopes (LST) and in the Middle Size Telescopes cameras of CTA, whereas ACTA has been designed only to be used in MST.

Regarding the upgrade of the LHCb calorimeter, the final chip (ICECALv3) of the analog signal processing channel has been designed, produced and tested. A second prototype of the PACIFIC ASIC with the input stage and shaper has been designed for SiPM readout in the new planned Scintillating Fiber Tracker.

Finally, a new version of the ASIC developed in 2013 for SiPM readout in medical imaging (PET Time-of-Flight) has been developed and successfully tested.

MIRADAS

During 2014 the trajectory algorithm has been designed. It has been necessary a thorough analysis of the collisions and possible interferences between the probe arms. The algorithm has been tested with base cases, providing promising results. Part of the results have been presented at the SPIE Astronomical Telescopes & Instrumentation 2014 that took place in Montreal, Canada.

Solar Orbiter

During year 2014, ICCUB researchers have tested the Engineering Model of the ISS, reaching the desired characteristics. An Electronic Ground Support Equipment (EGSE) has been prepared to test the following models (Qualification, Flight and Spare). It has also been started the manufacturing of the Qualification Model of the ISS in collaboration with Sener.

Montsec Astronomical Observatory

During 2014, in the context of space debris, the TFRM was collaborating in the ISON network, in the CO-VIII SSA/SST campaign of the ESA and participated in the contract Test-Bed for the Remote Control of an Automated Follow-Up Telescope. The total number of observations reported was 129,199, corresponding to 18,723 objects (tracks) with a mean of 247 objects per night (1520 positions per night). A mean of 24.6 objects per night without TLE (not in the Space-Track catalog) were observed.

Regarding the exoplanet survey, during 2014 ICCUB researchers continued observing 48 selected fields detecting hundreds of new variable stars and studying the possibility of new exoplanets around them using newly implemented algorithms. Also, the optical counterparts of four high-energy sources were systematically observed to establish the variations of their light curves and the models to explain them.
ICCUB researchers have been deeply involved in the Gaia Mission since the very beginning, with an important contribution within the Gaia Data Processing & Analysis Consortium (DPAC). They maintain the leading role of the Spanish groups in Gaia at the highest technological, scientific and management levels. The group has important responsibilities in the Coordination Units CU2 (simulations), CU3 (core processing), DPCB (Data Processing Center of Barcelona), CU5 (photometry) and leads the CU9 (Gaia Archive).

The ICCUB leads an EU FP7-funded project named GENIUS (2014–2017) to contribute to the development of the Gaia Archive, and participates in an EU FP7-funded initiative (GREAT-ITN, 2011–2015) and in a research network (GREAT-RNP, 2010–2015) funded by the European Science Foundation, both aiming to form the next generation of experts in the scientific use of Gaia data. Furthermore, ICCUB has one representative in the Gaia Scientific Team and one in the DPAC Executive Committee. It also has deputy managers in CU2 and CU3.

The knowledge gained on data compression tools has allowed the ICCUB to register a patent for one of its SW/HW solutions and to create a spin-off, DAPCOM.

The DIRAC (Distributed Infrastructure with Remote Agent Control) project is a complete Grid solution for a community of users developed by CERN, CNRS and ICCUB. It was created to handle the distributed computing of the LHCb experiment, and now other communities, such as CTA, have begun to use it. The ICCUB is now responsible of the continuous updates.

Activity 2014

Since the Gaia launch the main activities have concentrated in understanding and analyzing the data received during commissioning and during the first months of scientific operations to precisely evaluate the performances of the payload and the satellite. Several problems were encountered, the most important being the mirror’s contamination, the high level of background and the variations on the basic angle.

Several patches have been introduced in the Initial Data Treatment system (IDT), developed at ICCUB, in order to cope with the real telemetry as well as with the onboard detection levels, changes in the control electronics etc. Testing in parallel of new IDT versions still continue. The tasks of development of other mission critical software packages like the Intermediate Data Update (IDU), which has to be operative at the end of 2015, or the completion of the photometric calibration model, are important commitments of the group. At present the large telemetry simulations have been completed by producing very large datasets mocking the final Gaia catalogue. These datasets will be used to prepare the final catalogue and database, containing more than one billion objects. This task is, by ESA decision, leaded by the ICCUB group. The ICCUB team is developing and coordinating the ongoing processing tasks to fully deploying the new ones associated to the Gaia Archive.

In 2014 the DIRAC software has been extended for better integration of Cloud resources with Grid. This integration ensures that DIRAC will still be a competitive project as the trend in distributed computing evolves.
DAPCOM Data Services (ESA BIC Barcelona)

DAPCOM Data Services S.L. is a spin-off company participated by the University of Barcelona (UB) and the Technical University of Catalonia (UPC), specialized on the handling and processing of large amounts of data. It provides software engineering solutions and high-performance data compression strategies including proprietary implementations.

DAPCOM commercializes FAPEC (Fully Adaptive Prediction Error Coder), a patented lossless data compression algorithm originally created for satellite payloads. Besides being resilient to outliers in the data, it offers an optimum compromise between resources consumption and compression ratio. It can be applied to scientific research projects, supercomputing, or companies dealing with Big Data scenarios.

http://www.dapcom.es

Ideas Service (SiUB)

The IDEAS Service (Servei per la Innovació del Disseny Electrònic Avançat de Sistemes a la UB), or SiUB, is an instrumentation service of the Physics Faculty of the UB which, by the one hand, provides a service on electronics and microelectronics instrumentation design, development and test to research groups of the UB and other research institutions, and by the other hand, enhances the industry technology transfer. SiUB staff and associate members hold more than ten years of experience developing instrumentation at different levels: Design and test of Application-Specific Integrated Circuits (ASICs), Design and test of cards and PCBs and Development of equipment and systems. SiUB is making use of this experience.

http://siub.ub.edu

Activeitiy 2014

Dapcom

DAPCOM has been one of the first companies selected for the new ESA Business Incubation Centre (BIC) of Barcelona due to the potential of FAPEC for being transferred to terrestrial applications. The two-years incubation program at the UPC Campus of Castelldefels is providing the necessary resources to boost the R&D activities, including the IEEC-DAPCOM PICFAPEC project (Parallel and Imaging Capabilities for FAPEC). The first work package was nearly finished by the end of 2014, leading to a DWT-based pre-processing stage for lossless or lossy FAPEC image compression.

Ideas Service (SiUB)

After its creation in 2013, the service has slowly started to operate providing support for local research groups and external laboratories. The service has also signed collaboration agreements with a couple of companies.

To begin with, several ASIC designs have been produced for LHCb and CTA projects, using different technologies (IBM 130nm, TSMC 130nm or AMS 350nm SiGe BICMOS). See section Electronic and Instrumentation Development for more details.

PACTA family of ASICs has also shown good characteristics for a variety of applications related to PMT readout. This has allowed using PACTA in two other projects for ICFO and CNRS.

Finally, several collaboration agreements have been signed with Scientifica Internacional S.L. and Hamamatsu Photonics for the development of readout electronics for photo-detectors. In both cases, good results open the opportunity of longer term relationships.
<table>
<thead>
<tr>
<th>Project/Network</th>
<th>Reference</th>
<th>PI</th>
<th>Agency</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced European Infrastructures for Detectors at Accelerators (AIDA)</td>
<td>262025 (FP7-INFRASTRUCTURES)</td>
<td>Laurent Serin (CERN) (ICCUB: Ángel Diéguez)</td>
<td>European Community (EC)</td>
<td>01/02/2011 – 31/01/2015</td>
</tr>
<tr>
<td>Cosmological physics with future large scale structure surveys (PHYSS.LSS)</td>
<td>240117 (FP7-IDEAS-ERC)</td>
<td>Licia Verde</td>
<td>European Research Council (ERC)</td>
<td>01/11/2009 – 30/11/2015</td>
</tr>
<tr>
<td>European Particle physics Latin American NETwork (EPLANET)</td>
<td>PIRSES-GA-2009-246806 (FP7-PEOPLE)</td>
<td>Luciano Maiani (Università degli Studi di Roma, La Sapienza) (ICCUB: Domène Espriu)</td>
<td>European Community (EC)</td>
<td>01/02/2011 – 31/01/2015</td>
</tr>
<tr>
<td>Gaia European Network for Improved User Services (GENIUS)</td>
<td>606740 - GENIUS (FP7-SPACE)</td>
<td>Xavier Luri</td>
<td>European Community (EC)</td>
<td>01/10/2013 – 31/03/2017</td>
</tr>
<tr>
<td>Gaia European Network for Improved User Services (GENIUS)</td>
<td>08-RNP-118</td>
<td>Nick Walton (ICCUB: Carme Jordi)</td>
<td>European Science Foundation (ESF)</td>
<td>18/02/2010 – 17/02/2015</td>
</tr>
<tr>
<td>Gaia Research for European Astronomy Training (GREAT-ITN)</td>
<td>PITN-GA-2010-264895 (FP7-PEOPLE)</td>
<td>Nick Walton (ICCUB: Francesca Figueras)</td>
<td>European Community (EC)</td>
<td>01/03/2011 – 28/02/2015</td>
</tr>
<tr>
<td>Holography for the LHC era (HoloLHC)</td>
<td>306605 (FP7-IDEAS-ERC)</td>
<td>David Mateos</td>
<td>European Community (EC)</td>
<td>01/10/2012 - 30/09/2017</td>
</tr>
<tr>
<td>INVISIBLES</td>
<td>PITN-GA-2011-289442 (FP7-PEOPLE)</td>
<td>B. Gavela (UAM) (ICCUB: Mª Concepción González-García)</td>
<td>European Community (EC)</td>
<td>01/04/2012 - 31/03/2016</td>
</tr>
<tr>
<td>Probing strongly coupled deconfined matter at the LHC (DECOLHC)</td>
<td>PCIG12-GA-2012-333786 (FP7-PEOPLE)</td>
<td>Joan Soto, Jorge Casalderrey-Solana</td>
<td>European Community (EC)</td>
<td>01/03/2013 – 31/10/2016</td>
</tr>
<tr>
<td>Protecting space assets from high energy particles by developing European dynamic modelling and forecasting capabilities (SPACECAST)</td>
<td>SPA.2010.2.3-01 (262468) (FP7-SPACE)</td>
<td>Richard Horne (British Antarctic Survey) (ICCUB: Blai Sanahuja)</td>
<td>European Community (EC)</td>
<td>01/03/2011 – 28/02/2014</td>
</tr>
<tr>
<td>Star Formation in the Turbulent Interstellar Medium (SFTISM)</td>
<td>PIRG07-GA-2010-261359 (FP7-PEOPLE)</td>
<td>Paolo Padoan, Eduard Salvador-Solé</td>
<td>European Community (EC)</td>
<td>01/01/2011 - 31/12/2014</td>
</tr>
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</table>
Agency: European Community (EC)
Period: 01/01/2012 - 31/12/2014

**Studying at high energies the dynamical and non-thermal processes in astrophysical outflows (ASTFLOW)**
Reference: PCIG11-GA-2012-321520
PI: Josep Mª Paredes, Valentí Bosch-Ramon
Agency: European Community (EC)
Period: 01/03/2013 - 28/02/2017

**The Astrodynamics Network (ASTRONET-II)**
Reference: PITN-GA-2011-289240 (FP7-PEOPLE)
PI: Gerard Gómez
Agency: European Community (EC)
Period: 01/01/2012 - 31/12/2015

**The Preparatory Phase for the Cherenkov Telescope Array (CTA-PP)**
Reference: 262053 (FP7-INFRASTRUCTURES)
PI: Werner Hofmann (MPIfK) (ICCUB: Josep Mª Paredes)
Agency: European Community (EC)
Period: 01/01/2010 - 31/08/2014

**The String Theory Universe**
Reference: MP1210 (Cost Action)
PI: Silvia Penati (Universita’ di Milano-Bicocca) (ICCUB: Roberto Emparan)
Agency: COST Action (European Cooperation in Science and Technology)
Period: 04/03/2013 - 03/03/2017

**OTHER INTERNATIONAL PROJECTS**

**Preconditioning of the interplanetary medium as responsible for large intense SEP events: Radial and longitudinal effects**
Reference: NNX11AO83G
PI: David Lario (Johns Hopkins University/APL) (ICCUB: Neus Águeda)
Agency: NASA
Period: 01/08/2011 - 01/07/2015

**Injection of nucleate-boiling slug flows into a heat exchange chamber**
Reference: FA8655-12-1-2060

**Contract for the initial portion of the final design of the MIRADAS Spectrograph for the Gran Telescopio de Canarias**
Reference: MIRADAS II
PI: Jordi Torra Roca
Agency: U. Florida
Period: 10/06/2014 - 31/07/2014

**NATIONAL PLAN PROJECTS**

**Auto-organización en materiales blandos y materia viva: II) Fluidos complejos, Células y Tejidos**
Reference: FIS2010-21924-C02-02
PI: Jaume Casademunt
Agency: MICINN
Period: 01/01/2011 - 30/06/2014

**COM SOM (Cosmology and the Origin of Matter, Sabor y Origen de la Materia)**
Reference: FPA2011-29678-C02-02
PI: Licia Verde
Agency: MINECO
Period: 01/01/2012 - 31/12/2014

**Contribución al desarrollo científico y tecnológico de la misión Gaia II**
Reference: AYA2012-39551-C02-01
PI: Jordi Torra Roca
Agency: MINECO
Period: 01/01/2013 - 30/09/2014

**Contribución al desarrollo científico y tecnológico de la misión Gaia III**
Reference: ESP2013-48318-C2-1-R
PI: Jordi Torra Roca
Agency: MINECO
Period: 01/01/2014 - 30/09/2015
Desarrollo de nuevos detectores para los futuros colisionadores en Física de Partículas
Reference: FPA2010–21549–C04–01
Pl: Ángel Diéguez
Agency: MICINN
Period: 01/01/2011 – 01/09/2014

Desarrollo de nuevos detectores y estudios de física para futuros colisionadores lineales
Reference: FPA2013–48387–C6–4–P
Pl: Ángel Diéguez
Agency: MINECO
Period: 01/01/2014 – 31/12/2015

Diseño detallado de SOLAR ORBITER/PHI
Reference: AYA2011–29833–C06–05
Pl: Josep Mª Gómez-Cama
Agency: MICINN
Period: 01/01/2012 – 31/12/2014

Diseño detallado, fabricación e integración de SO/PHI
Reference: AYA2012–39636–C06–02
Pl: Josep Mª Gómez-Cama
Agency: MINECO
Period: 01/01/2013 – 31/12/2014

Estructura a Gran Escala, Cuásares y las Primeras Estrellas con los Espectros de Absorción de Cuásares de BOSS
Reference: AYA2012–33938
Pl: Jordi Miralda-Escudé
Agency: MICINN
Period: 01/01/2013 – 31/12/2015

Estudio de la Violación de CP con el detector LHCb
Reference: FPA2011–30163–C02–01
Pl: Eugeni Graugés
Agency: MICINN
Period: 01/01/2012 – 31/12/2014

Eyecciones astrofísicas en procesos de alta energía no térmicos. Teoría y observaciones multi-longitud de onda
Reference: AYA2013–47447–C3–1–P
Pl: Josep Mª Paredes
Agency: MINECO
Period: 01/01/2014 – 31/12/2016

Fabricación e integración de SOIPHI (Polarimetric and Helioseismic Imager for Solar Orbiter)
Pl: Josep Mª Gómez-Cama
Agency: MINECO
Period: 01/01/2014 – 31/12/2015

Hacia una Píldora inteligente para la diagnosis y tratamiento de cáncer gastrointestinal
Reference: TEC2013–49954–EXP
Pl: Ángel Diéguez
Agency: MINECO
Period: 03/04/2014 – 31/12/2014

High-energy phenomena in stellar objects. Theory and multi-wavelength observations
Reference: AYA2010–21782–C03–01
Pl: Josep Mª Paredes
Agency: MICINN
Period: 01/01/2011 – 30/06/2014

Información Cuántica: entrelazamiento, frustración, gases fríos y orden topológico
Reference: FIS2013–41757–P
Pl: José Ignacio Latorre
Agency: MINECO
Period: 01/01/2014 – 31/12/2015

Información Cuántica: entrelazamiento, redes de tensores y gases fríos.
Reference: FIS2010–16185
Pl: José Ignacio Latorre
Agency: MICINN
Period: 01/01/2011 – 30/06/2014

Interstellar medium at high-angular resolution: preparing for the ALMA era
Reference: AYA2011–30228–C03–03
Pl: Robert Estalella
Agency: MICINN
Period: 01/01/2012 – 30/09/2015

Las Componentes del Universo
Reference: AYA2012–36353
Pl: M. Pilar Ruiz Lapuente
Agency: MINECO
Period: 01/01/2013 – 31/12/2015

Materia blanda forzada, activa y viva
Reference: FIS2013–41144–P
Pl: Jaume Casademunt
Agency: MINECO
Period: 01/01/2014 – 31/12/2016

Métodos constructivos en sistemas dinámicos y aplicaciones
Reference: MTM2012–32541
Pl: Ángel Jorba
Agency: MINECO
Period: 01/01/2013 – 31/12/2015
Modelado de la reionización del universo y de las galaxias que la causan
Reference: AYA2012-39168-C03-02
PI: Eduard Salvador-Solé
Agency: MINECO
Period: 01/01/2013 – 31/12/2015

Non-thermal high-energy processes in astrophysical outflows. Theory and multi-wavelength observations.
Reference: AYA2013-47447-C3-2-P
PI: Kazushi Iwasawa
Agency: MINECO
Period: 01/01/2014 – 31/12/2016

Participación española en el diseño y prototipado del Cherenkov Telescope Array: perspectivas de física, prototipado de ASICs y explotación de DIRAC
Reference: FPA2013-48381-C6-6-P
PI: Marc Ribó
Agency: MINECO
Period: 01/01/2014 – 31/12/2015

Red de infraestructuras de astronomía
Reference: AYA2014-53365-REDT
PI: Jordi Torra Roca
Agency: MINECO
Period: 01/12/2014 – 30/11/2016

Simulación Monte Carlo del transporte de radiación. Emisión de electrones secundarios
Reference: FPA2013-44549-P
PI: Francesc Salvat
Agency: MINECO
Period: 01/01/2014 – 31/12/2016

Simulaciones de interacciones y fusiones de galaxias durante la formación de grupos
Reference: AYA2013-40609-P
PI: Josep Mª Solanes
Agency: MINECO
Period: 01/01/2014 – 31/12/2016

Sistemas de Fermi fuertemente correlacionados: átomos, núcleos y hadrones
Reference: FIS2011-24154
PI: Xavier Viñas
Agency: MICINN
Period: 01/01/2012 – 31/12/2015

Spanish Participation in the LHCb experiment at CERN: Physics exploitation and Upgrade.
Reference: FPA2013-48020-C3-3-P
PI: Ricardo Graciani Díaz
Agency: MINECO
Period: 01/01/2014 – 31/12/2015

Sucesos solares de partículas energéticas: análisis y modelos. Aplicaciones para Solar Orbiter y herramientas para el tiempo espacial
Reference: AYA2013-42614-P
PI: Blai Sanahuja
Agency: MINECO
Period: 01/01/2014 – 31/12/2016

Teorías efectivas de las interacciones fuertes: aplicaciones a quarkonium pesado y a QCD bajo condiciones externas.
Reference: FPA2010-16963
PI: Joan Soto
Agency: MICINN
Period: 01/01/2011 – 30/06/2015

Teoría y fenomenología de las interacciones fundamentales: Física de partículas y la unificación de las fuerzas
Reference: FPA2010-20807-C02-01
PI: Domèneç Espriu
Agency: MICINN
Period: 01/01/2011 – 30/06/2014

Teoría y fenomenología de las interacciones fundamentales: física de partículas y unificación de las fuerzas.
Reference: FPA2013-46570-C2-1-P
PI: Domèneç Espriu
Agency: MINECO
Period: 01/01/2014 – 31/12/2016

Teoría y fenomenología de las interacciones fundamentales: Gravitación y cosmología
Reference: FPA2010-20807-C02-02
PI: Roberto Emparan
Agency: MICINN
Period: 01/01/2011 – 31/12/2014

Teoría y fenomenología de las interacciones fundamentales: gravitación y cosmología
Reference: FPA2013-46570-C2-2-P
PI: Roberto Emparan
Agency: MINECO
Period: 01/01/2014 – 31/12/2016
CONSIDER INGENIO PROJECTS

Centro nacional de física de partículas, astropartículas y nuclear
Reference: CSD2007-00042
PI: Antonio Pich, IFIC (ICCUB: Lluís Garrido)
Agency: MEC
Period: 01/10/2007 – 09/06/2015

Canfranc Underground Physics
Reference: CSD2008-00037
PI: Mª Concepción González-García
Agency: MEC
Period: 15/12/2008 – 14/12/2015

OTHER NATIONAL GRANTS

GaiaApp
Reference: FCT-13-7148
PI: Jordi Torra
Agency: FECYT
Period: 01/09/2013 – 31/08/2014

Hacia pruebas holográficas de la materia caliente en el LHC
Reference: FPA2013-40360-ERC
PI: Jorge Casalderrey-Solana
Agency: MINECO
Period: 01/12/2013 – 30/11/2014

Participación Española en la Fase Preparatoria del Cherenkov Telescope Array (CTA)
PI: Marc Ribó
Agency: MICINN
Period: 10/08/2011 – 10/08/2014

Preparation for 'DIRAC Virtual Research Environments'
Reference: EUIN2013-50926
PI: Ricardo Graciani Díaz
Agency: MINECO
Period: 01/01/2014 – 31/12/2014

PTA Mod. Impulso a la Participación Internacional
Reference: PTA2012-7891-A
PI: Jordi Torra, M. Dolores Balaguer-Núñez
Agency: MINECO
Period: 01/10/2013 – 30/09/2016

PTA Mod. Infraestructuras científico-tecnicas: Gaia
Reference: PTA2010-3704-I
PI: Jordi Torra
Agency: MINECO
Period: 20/01/2011 – 19/01/2014

The Milky Way Unravelled by Gaia. The final conference of the GREAT (Gaia Research for European Astronomy Training) network
Reference: FCT-14-9208
PI: Francesca Figueras
Agency: FCYT
Period: 01/09/2014 – 31/12/2014
CONSOLIDATED GROUPS

**Astronomia i Astrofísica**
Reference: 2014SGR86
PI: Josep Mª Paredes
Agency: AGAUR
Period: 01/01/2014 – 31/12/2016

**Física nuclear teòrica i de moltes partícules en interacció**
Reference: 2014SGR401
PI: Àngels Ramos
Agency: AGAUR
Period: 01/01/2014 – 31/12/2016

**Gravitation, Strings, and Cosmology**
Reference: 2014SGR1474
PI: Jaume Garriga
Agency: AGAUR
Period: 01/01/2014 – 31/12/2016

**Grup de Física Teòrica d'Altes Energies (FISALTEN)**
Reference: 2014SGR104
PI: Jorge Russo
Agency: AGAUR
Period: 01/01/2014 – 31/12/2016

**Grup de Física Experimental d'altes energies**
Reference: 2014SGR769
PI: Lluís Garrido
Agency: AGAUR
Period: 01/01/2014 – 31/12/2016

**Grup de Sistemes Dinàmics**
Reference: 2014SGR1145
PI: Àngel Jorba
Agency: AGAUR
Period: 01/01/2014 – 31/12/2016

**Grup de Física Experimental d'Altes Energies**
Reference: 2009SGR1268
PI: Lluís Garrido
Agency: AGAUR
Period: 26/11/2009 – 31/05/2014

**Grup d’informació i simulació quàntiques (UB)**
Reference: 2014SGR727
PI: José Ignacio Latorre
Agency: AGAUR
Period: 01/01/2014 – 31/12/2016

**Maximizing the scientific return of future galaxy surveys**
Reference: 2009SGR1280
PI: Licia Verde
Agency: AGAUR
Period: 03/07/2009 – 02/12/2014

**Physical Cosmology, PhysCos**
Reference: 2014SGR921
PI: Licia Verde
Agency: AGAUR
Period: 01/01/2014 – 31/12/2016

CONTRACTS WITH THE INDUSTRY

**Advanced electronics for Hamamatsu detectors (I)**
Reference: FBG 307548
PI: Ricardo Graciani Díaz
Agency: Hamamatsu Photonics France S.A.R.L.
Period: 10/11/2013 – 18/01/2014

**Advanced electronics for Hamamatsu detectors (II)**
Reference: FBG 307550
PI: Ricardo Graciani Díaz
Agency: Hamamatsu Photonics France S.A.R.L.
Period: 18/11/2013 – 04/05/2014

**Advanced electronics for Hamamatsu detectors (III)**
Reference: FBG 307696
PI: Ricardo Graciani Díaz
Agency: Hamamatsu Photonics France S.A.R.L.
Period: 08/02/2014 – 30/09/2014

**Advanced electronics for Hamamatsu detectors (IV)**
Reference: FBG 307697
PI: Ricardo Graciani Díaz
Agency: Hamamatsu Photonics France S.A.R.L.
Period: 08/02/2014 – 18/04/2014
4. PROJECTS AND FUNDS

Advanced electronics for Hamamatsu detectors (V)
Reference: FBG 307699
PI: Ricardo Graciani Díaz
Agency: Hamamatsu Photonics France S.A.R.L.
Period: 15/02/2014 - 09/05/2014

Advanced electronics for Hamamatsu detectors (VIII)
Reference: FBG 307758
PI: Ricardo Graciani Díaz
Agency: Hamamatsu Photonics France S.A.R.L.
Period: 05/05/2014 - 08/06/2014

Asesoramiento sobre el desarrollo y prueba de circuitos electrónicos para discriminación de señales en detectores de partículas
Reference: FBG 306720
PI: Lluís Garrido
Agency: Scientifica Internacional
Period: 27/02/2012 - 26/02/2014

Joint research agreement. Work: Further development of the modification and/or customization of PENEOPE, which is under consulting service between the parties, for use with lower energy particles below 100 eV
Reference: FBG 307269
PI: Francesc Salvat
Agency: Hamamatsu Photonics K.K.
Period: 01/04/2013 - 31/03/2015

Miniaturization of the controller for an endoscopic diagnosis capsule
Reference: FBG 307319
PI: Angel Diéguez
Agency: Ovesco Endoscopy AG
Period: 02/05/2013 - 01/05/2014

Optimització de recursos en entorns sostenibles
Reference: FBG 307429
PI: Lluís Garrido
Agency: WeeDooCare Business Solutions GmbH
Period: 16/09/2013 - 15/01/2014

Optimització de recursos en entorns sostenibles
Reference: FBG 307607
PI: Lluís Garrido
Agency: WeeDooCare Business Solutions GmbH
Period: 16/01/2014 - 30/06/2014

Production of FlexToFv1 demonstrator elements
Reference: FBG 307910
PI: Ricardo Graciani Díaz
Agency: Hamamatsu Photonics France S.A.R.L.
Period: 28/07/2014 - 01/10/2014

Production of FlexToFv1 demonstrator elements
Reference: FBG 307911
PI: Ricardo Graciani Díaz
Agency: Hamamatsu Photonics France S.A.R.L.
Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V; Ruiz, H.)

1. A study of CP violation in $B^+ \to D K^*$ and $B^0 \to D \pi^*$ decays with $D \to K^0_S K^+ \pi^-$ final states. Article.


2. Evidence for the decay $X(3872) \to \psi(2S) \pi^-$. Article.


3. Observation of Photon Polarization in the $b \to s \gamma$ Transition. Article.


4. Observation of $Z$ production in proton-lead collisions at LHCb. Article.


5. Observation of $Z$ production in proton-lead collisions at LHCb. Article.


7. Addendum: Observation of double charm production involving open charm in pp collisions at $\sqrt{s} = 7$ TeV. Article.

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V; Ruiz, H.)

*Dalitz plot analysis of $B_s^0 \rightarrow D_s^0 K^-\pi^+$ decays.*


Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V; Ruiz, H.)

*Measurement of the $B^+ \rightarrow J/\psi\phi\nu$ $X$ decays.*

European Physical Journal C, Vol. 74, Iss. 05, Num. 2839 (2014) 10.1140/epjc/s10052-014-2839-x

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V; Ruiz, H.)

*Measurement of $B^0 \rightarrow D^-\bar{D}^+_s$ and $B^0 \rightarrow D_s^-\bar{D}^+_s$ effective lifetimes.*


Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V; Ruiz, H.)

*Measurement of the flavour-specific CP-violating asymmetry $a'_d$ in $B^0_s$ decays.*


Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V; Ruiz, H.)

*Measurement of the forward $W$ boson cross-section in pp collisions at $\sqrt{s} = 7$ TeV.*


Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V; Ruiz, H.)

*Measurement of $Y$ production in pp collisions at $\sqrt{s} = 2.76$ TeV.*

European Physical Journal C, Vol. 74, Iss. 04, Num. 2835 (2014) 10.1140/epjc/s10052-014-2835-1

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V; Ruiz, H.)

*Measurements of CP violation in the three-body phase space of charmless $B^+$ decays.*
Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Measurements of indirect CP asymmetries in $D^0 \rightarrow K^- K^+$ and $D^0 \rightarrow \pi^- \pi^+$ decays Article.
10.1103/PhysRevLett.112.041801

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Measurements of the $B^+$, $B^0$, $B^0_s$ meson and $A^0_b$ baryon lifetimes. Article.
10.1007/JHEP04(2014)114

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Observation of associated production of a $Z$ boson with a $D$ meson in the forward region. Article.
10.1007/JHEP04(2014)091

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Observation of $B^0_s \rightarrow J/\psi f_1 (1285)$ Decays and Measurement of the $f_1 (1285)$ Mixing Angle. Article.
10.1103/PhysRevLett.112.091802

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Observation of the $B^0_s \rightarrow J/\psi K^0_s K^+ \pi^-$ decay. Article.
10.1007/JHEP07(2014)140

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.;
Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Obervation of the $A^0_b \rightarrow J/\psi \pi \pi^-$ decay. Article.
10.1007/JHEP07(2014)103

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Search for CP violation in $D^0 \rightarrow \pi^- \pi^+ \pi^0$ decays with the energy test. Article.
10.1016/j.physletb.2013.12.035

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Search for CP violation in the decay $D^+ \rightarrow \pi^+ \pi^- \pi^0$ Article.
10.1016/j.physletb.2013.11.053

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Searches for $A^0_b$ and $\Xi_b^0$ decays to $K^- p\pi^-$ and $K^0_\pi^- p K^- \pi^-$ final states with first observation of the $A^0_b \rightarrow K^- p\pi^-$ decay. Article.
10.1007/JHEP04(2014)087

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Studies of beauty baryon decays to $D^0 p h^- \pi^-$ and $A^+_b h^- \pi^-$ final states. Article.
Physical Review D, Vol. 89, Iss. 03, Num. 32001 (2014)
10.1103/PhysRevD.89.032001

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.;
Grauges, E.; Picatoste Olloqui, E.; Poterat, C.; Rives Molina, V.; Ruiz, H.)
Observation of the $A^0_b \rightarrow J/\psi \pi \pi^-$ decay. Article.
10.1007/JHEP07(2014)103

Study of forward Z* jet production in pp collisions at $\sqrt{s} = 7$ TeV. Article.
10.1007/JHEP01(2014)033

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Ollqui, E.; Potterat, C.; Rives Molina, V.; Ruiz, H.)

Study of $J/\Psi$ production and cold nuclear matter effects in $pPb$ collisions at $\sqrt{s_{NN}} = 5$ TeV. Article.
10.1007/JHEP02(2014)072

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Ollqui, E.; Potterat, C.; Rives Molina, V.; Ruiz, H.)

Study of $X_s$ meson production in pp collisions at $\sqrt{s} = 7$ and 8TeV and observation of the decay $X_s(3P) \rightarrow Y(3S)y$. European Physical Journal C, Vol. 74, Iss. 10, Num. 3092, p. 1-13 (2014)
10.1140/epjc/s10052-014-3092-z

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Ollqui, E.; Potterat, C.; Rives Molina, V.; Ruiz, H.)

Measurement of the charge asymmetry in $B^{+} \rightarrow \phi K^+$ and search for $B^{-} \rightarrow \phi \pi^+$ decays. Article.
10.1016/j.physletb.2013.11.036

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Ollqui, E.; Potterat, C.; Rives Molina, V.; Ruiz, H.)

Search for Majorana neutrinos in $B^+ \rightarrow \pi^+\mu^+\mu^-$ decays. Article.
10.1103/PhysRevLett.112.131802

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Ollqui, E.; Rives Molina, V.; Ruiz, H.)

Angular analysis of charged and neutral $B \rightarrow K\mu^+\mu^-$ decays. Article.
Journal of High Energy Physics, Vol. 2014, Iss. 05, Num. 82 (2014)
10.1007/JHEP05(2014)082

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Ollqui, E.; Rives Molina, V.; Ruiz, H.)

Differential branching fractions and isospin asymmetries of $B \rightarrow K^{*}\mu^+\mu^-$ decays. Article.
10.1007/JHEP06(2014)133

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Ollqui, E.; Rives Molina, V.; Ruiz, H.)

Effective lifetime measurements in the $B_s^0 \rightarrow K^+K^-$, $B^0 \rightarrow K^+\pi^-$ and $B_s^0 \rightarrow \pi^+K^-$ decays. Article.
10.1016/j.physletb.2014.07.051

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Ollqui, E.; Rives Molina, V.; Ruiz, H.)

Evidence for the decay $B_{s}^{+} \rightarrow J/\Psi 3\pi^{+}2\pi^{-}$. Article.
10.1007/JHEP05(2014)148

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Ollqui, E.; Rives Molina, V.; Ruiz, H.)

First measurement of the charge asymmetry in beauty-quark pair production. Article.
Physical Review Letters, Vol. 113, Iss. 08, Num. 82003 (2014)
10.1103/PhysRevLett.113.082003

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Ollqui, E.; Rives Molina, V.; Ruiz, H.)

Measurement of CP asymmetry in $D^0 \rightarrow K^+K^-$ and $D^0 \rightarrow \pi^+\pi^-$ decays. Article.
10.1007/JHEP07(2014)041

Aaij, R; et al. (LHCb Collaboration; ICCUB: Camboni, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin
Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)
Measurement of the $\phi \pi$ and $\chi_{K\pi}^0$ production branching fractions to $B^0 \to K^0\mu^+\mu^-$ and $B^0 \to K^-\mu^+\mu^-$. Article. Journal of High Energy Physics, Vol. 2014, Iss. 09, Num. 088 (2014) 10.1007/JHEP09(2014)088

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)
Measurement of the $\phi \pi$ and $\chi_{K\pi}^0$ mass and of the relative rate of $\chi_{K\pi}^0(1P)$ and $\chi_{K\pi}^0(2P)$ production. Article. Journal of High Energy Physics, Vol. 2014, Iss. 10, Num. 177 (2014) 10.1007/JHEP10(2014)097

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)
Measurement of $\phi \pi$ asymmetries in the decays $B^+_s \to D_s^+ K^-\mu^+\mu^-$. Article. Journal of High Energy Physics, Vol. 2014, Iss. 11, Num. 60 (2014) 10.1007/JHEP11(2014)060

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)
Measurement of CP violation in $B^0 \to \phi \phi$ decays. Physical Review D, Vol. 90, Iss. 05, Num. 52011 (2014) 10.1103/PhysRevD.90.052011

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)
Measurement of CP violation parameters in $B^0 \to DK^{*0}$ decays. Physical Review D, Vol. 90, Iss. 11, Num. 112002 (2014) 10.1103/PhysRevD.90.112002

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)
Measurement of the $\phi \pi$ and $\chi_{K\pi}^0$ branching fractions to $J/\psi\mu^+\mu^-$ and $J/\psi\pi^+\pi^-$ final states. Physical Review D, Vol. 90, Iss. 03, Num. 32009 (2014) 10.1103/PhysRevD.90.032009

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)
Observation of Overlapping Spin-1 and Spin-3 $D^{*0}K^-$ Resonances at Mass 2.86 GeV/c$^2$. Article.
10.1103/PhysRevLett.113.162001

Aaij, R; et al. (LHCb Collaboration; ICCUB: Garrido, L.; Graciani Diaz, R.; Grauges, E.; Marin Benito, C.; Picatoste Olloqui, E.; Rives Molina, V.; Ruiz, H.)
Test of Lepton Universality Using $B^+ \rightarrow K^+ \ell^+ \ell^-$ Decays. Article.
10.1103/PhysRevLett.113.151601

Abedi, H.; Mateu, C.; Aguilar, L.; Figueras, F.; Romero-Gómez, M.
Characterizing the Galactic warp with Gaia: I. The tilted ring model with a twist. Article.
10.1093/mnras/stu1035

Agrawal, B.K.; De, J.N.; Samaddar, S.K.; Centelles, M.; Viñas, X.
Symmetry energy of warm nuclear systems. Article.
10.1140/epja/i2014−14019-8

Agueda, N.; et al (ICCUB: Sanahuja, B.)
Release Timescales of Solar Energetic Particles in the Low Corona. Article.
10.1051/0004-6361/201423549

Ahn, C.P.; etal. (ICCUB: Cuesta, A.J.; Miralda-Escudé, J.; Pérez-Rafols, I.)
The Tenth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the SDSS-III Apache Point Observatory Galactic Evolution Experiment. Article.
Astrophysical Journal Supplement Series, Vol. 211, Iss. 02, Num. 17 (2014)
10.1088/0067-0049/211/2/17

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Galindo, D.; Marcote, B.; Munar-Adrover, P.; Paredes, J.M.; Paredes-Fortuny, X.; Ribo, M.; Zanin, R.)
Black hole lightning due to particle acceleration at subhorizon scales. Article.

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Camboni, A.; Comerma-Montells, A.; Garrido, L.; Graciani Diaz, R.; Grauges, E.; Picatoste Olloqui, E.; Potterat, C.; Rives Molina, V.; Ruiz, H.)
Updated measurements of exclusive $J/\psi$ and $\psi(2S)$ production cross-sections in $pp$ collisions at $\sqrt{s}=7$ TeV Article.

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Sanahuja, B.)
Discovery of TeV $\gamma$-ray emission from the pulsar wind nebula 3C 58 by MAGIC Article.
10.1051/0004-6361/201424261

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Galindo, D.; Marcote, B.; Munar-Adrover, P.; Paredes, J.M.; Paredes-Fortuny, X.; Ribo, M.; Zanin, R.)
Discovery of very high energy gamma-ray emission from the blazar 1ES 1727+502 with the MAGIC Telescopes. Article.
10.1051/0004-6361/2014232951

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Galindo, D.; Marcote, B.; Munar-Adrover, P.; Paredes, J.M.; Paredes-Fortuny, X.; Ribo, M.; Zanin, R.)
Contemporaneous observations of the radio galaxy NGC 1275 from radio to very high energy $\gamma$-rays. Article.
10.1051/0004-6361/201322951

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Galindo, D.; Marcote, B.; Munar-Adrover, P.; Paredes, J.M.; Paredes-Fortuny, X.; Ribo, M.; Zanin, R.)
First broadband characterization and redshift determination of the VHE blazar MAGIC J2001+439. Article.
10.1051/0004-6361/201424254
Paredes-Fortuny, X.; Ribo, M.; Zanin, R.)
MAGIC gamma-ray and multi-frequency observations of flat spectrum radio quasar PKS 1510-089 in early 2012. Article.

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Marcote, B.; Munar-Adrover, P.; Paredes, J. M.; Paredes-Fortuny, X.; Ribo, M.; Zanin, R.)
MAGIC long-term study of the distant TeV blazar PKS 1424+240 in a multiwavelength context. Article.

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Marcote, B.; Munar-Adrover, P .; Paredes, J. M.; Paredes-Fortuny , X.; Ribo, M.; Zanin, R.)
MAGIC observations and multifrequency properties of the flat spectrum radio quasar 3C 279 in 2011. Article.

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Marcote, B.; Munar-Adrover, P.; Paredes, J. M.; Paredes-Fortuny, X.; Ribo, M.; Zanin, R.)
MAGIC reveals a complex morphology within the unidentified gamma-ray source HESS J1857+026. Article.

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Galindo, D.; Marcote, B.; Munar-Adrover, P.; Paredes, J. M.; Paredes-Fortuny, X.; Ribo, M.; Zanin, R.)
MAGIC search for VHE γ-ray emission from AE Aquarri in a multiwavelength context. Article.

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Moldon, J.; Munar-Adrover, P.; Paredes, J. M.; Ribo, M.; Zanin, R.)
Rapid and multiband variability of the TeV bright active nucleus of the galaxy IC 310. Article.

Aléksic, J; et al. (MAGIC Collaboration; ICCUB: Marcote, B.; Moldon, J.; Munar-Adrover, P.; Paredes, J. M.; Ribo, M.; Zanin, R.)
Search for very high energy gamma-rays from the z = 0.896 quasar 4C +55.17 with the MAGIC telescopes. Article.

Alert, R.; Casademunt, J.; Tierno, P.
Landscape-inversion phase transition in dipolar colloids: Tuning the structure and dynamics of 2D crystals. Article.

Ameller, L.; Talavera, P.
Lowest resonance in QCD from low-energy data. Article.

Anderson, L.; et al. (ICCUB: Cuesta, A.J.; Verde, L.)

Anderson, L.; et al. (ICCUB: Cuesta, A.J.; Verde, L.)
The clustering of galaxies in the SDSS-III Baryon
Oscillation Spectroscopic Survey: measuring DA and H at z = 0.57 from the baryon acoustic peak in the Data Release 9 spectroscopic Galaxy sample. Article.
10.1093/mnras/stt2206

André, P.; et al. (ICCUB: Verde, L.)
Journal Of Cosmology And Astroparticle Physics, Vol. 2014, Iss. 02, Num. 6 (2014)
10.1088/1475-7516/2014/02/006

Andrianov, A.A.; Andrianov, V.A.; Espriu, D.; Planells, X.
Analysis of dilepton angular distributions in a parity breaking medium. Article.
10.1103/PhysRevD.90.034024

Andrianov, A.A.; Andrianov, V.A.; Espriu, D.
Spontaneous parity violation under extreme conditions: An effective lagrangian analysis. Article.
European Physical Journal C, Vol. 74, Iss. 6, Num. 2932, p. 1-23 (2014)
10.1140/epjc/s10052-014-2932-1

Andrianov, A.A.; Espriu, D.; Planells, X.
Chemical potentials and parity breaking: the Nambu-Jona-Lasinio model. Article.
10.1140/epjc/s10052-014-2776-8

Baldo, M.; Burgio, G.F.; Centelles, M.; Sharma, B.K.; Viñas, X.
From the crust to the core of neutron stars on a microscopic basis. Article.
10.1134/S1063778814080031

Barkov, M.; Bosch-Ramon, V.
Formation of large-scale magnetic structures associated with the Fermi bubbles. Article.
10.1051/0004-6361/201322743

Barranco, A.; Russo, J.G.
Large N phase transitions in supersymmetric Chern-Simons theory with massive matter. Article.
10.1007/JHEP03(2014)012

Mild quasilocal non-Gaussianity as a signature of modified gravity during inflation. Article.
10.1103/PhysRevLett.113.161303

Basilakos, S.; Lima, J.A.S.; Solà, J.
A viable Starobinsky-like inflationary scenario in the light of Planck and BICEP2 results. Article.
10.1142/S0218271814420115

Basilakos, S.; Solà, J.
Effective equation of state for running vacuum: ‘mirage’ quintessence and phantom dark energy. Article.
10.1093/mnras/stt2135

Batlle, C.; Gomis, J.; Kamimura, K.; Zanelli, J.
Dynamical sectors for a spinning particle in AdS_3. Article.
10.1103/PhysRevD.90.065017

Batlle, C.; Gomis, J.; Kamimura, K.
Symmetries of the free Schrödinger equation in the non-commutative plane. Article.
Symmetry, Integrability and Geometry: Methods and Applications (SIGMA), Vol. 10, Num. 11 (2014)
10.3842/SIGMA.2014.011

Bazavov, A.; Brambilla, N.; Garcia-Tormo, X.; Petreczky, P.; Soto, J.; Vairo, A.
Determination of αs from the QCD static energy: An update. Article.
10.1103/PhysRevD.90.074038

Magnetic moments of light nuclei from lattice quantum chromodynamics. Article.
10.1103/PhysRevLett.113.252001

Bedin, L.R.; Ruiz-lapuente, P.; Gonzalez, J.I.; Canal, R.; Filippenko, A.V.; Mendez, J.
Improved Hubble Space Telescope proper motions for Tycho-G and other stars in the remnant of Tycho's Supernova 1572. Article.
10.1093/mnras/stt2460

Bergshoeff, E.; Gomis, J.; Kova, E.; M.; Parra, L.; Rosseel, J.; Zojer, T.
The Non-Relativistic Superparticle in a Curved Background. Article.
10.1103/PhysRevD.90.065006

Bergshoeff, E.; Gomis, J.; Longhi, G.
Dynamics of Carroll particles. Article.
Classical and Quantum Gravity, Vol. 31, Iss. 20, Num. 205009 (2014)
10.1088/0264-9381/31/20/205009

Bergström, J.; Gonzalez-Garcia, M. C.; Niro, V.; Salvado, J.
Statistical tests of sterile neutrinos using cosmology and short-baseline data. Article.
10.1007/JHEP10(2014)104

Bergström, J.; Meloni, D.; Merlo, L.
Bayesian comparison of U(1) lepton flavor models. Article.
Physical Review D, Vol. 89, Iss. 9, Num. 93021 (2014)
10.1103/PhysRevD.89.093021

Beutler, F.; et al. (ICCUB: Cuesta, A.J.)
10.1093/mnras/stu1702

Blanch-Mercader, C.; Casademunt, J.; Joanny, J.F.
morphology and growth of polarized tissues. Article.
European Physical Journal E, Vol. 37, Iss. 05, Num. (2014)
10.1140/epje/i2014-14041-2

Brivio, I.; Corbett, T.; Éboli, O.J.P.; Gavela, M.B.; Gonzalez-Fraile, J.; Gonzalez-Garcia, M.C.; Merlo, L.; Rigolin, S.
Disentangling a dynamical Higgs. Article.
10.1007/JHEP03(2014)024

Brivio, I.; Éboli, O. J. P.; Gavela, M. B.; Gonzalez-Garcia, M. C.; Merlo, L.; Rigolin, S.
Higgs ultraviolet softening. Article.
10.1007/JHEP12(2014)004

Burden, A.; Percival, W.J.; Manera, M.; Cuesta, A.J.; Vargas Magaña, M.; Ho, S.
Efficient Reconstruction of Linear Baryon Acoustic Oscillations in Galaxy Surveys. Article.
10.1093/mnras/stu1965

Cai, Z.; Fan, X.; Noterdaeme, P.; Wang, R.; McGreer, I.; Carithers, B.; Bian, F.; Miralda-Escudé, J.; Finley, H.; Pâris, I.; Schneider, D.P.; Zakamska, N.L.; Ge, J.; Pettijean, P.; Slosar, A.
A Glimpse at Quasar Host Galaxy Far-UV Emission Using Damped Lyman-alpha’s as Natural Coronagraphs. Article.
10.1088/0004-637X/793/2/139

Caicedo, C.; Zaragoza-Galán, G.; Crusats, J.; El-Hachemi, Z.; Martinez, A.; Rivera, R.
Design of novel luminescent porphyrins bearing donor-acceptor groups. Article.
10.1142/S1088426613501083

Camara, P.G.; Ibáñez, L.E.; Valenzuela, I.
Flux-induced soft terms on type IIb/F-theory matter curves and hypercharge dependent scalar masses. Article.
10.1007/JHEP06(2014)119

Cantat-Gaudin, T.; et al. (ICCUB: Jordi, C.; Balaguer-Núñez, L.)
10.1051/0004-6361/201423851

Carbone, A.; Rios, A.; Polls, A.
Correlated density-dependent chiral forces for infinite-matter calculations within the Green’s function approach. Article.
Physical Review C, Vol. 90, Iss. 05, Num. 54322 (2014)
10.1103/PhysRevC.90.054322

Carbone, A.; Polls, A.; Providencia, C.; Rios, A.; Vidaña, I.


5. PUBLICATIONS

Fiol, B.; Torrents, G.  
Exact results for Wilson loops in arbitrary representations. Article.  
10.1007/JHEP01(2014)020

Font-Ribera, A.; et al. (ICCUB: Miralda-Escudé, J.)  
Quasar-Lyman alpha forest cross-correlation from BOSS DR11: Baryon Acoustic Oscillations. Article.  
Journal Of Cosmology And Astroparticle Physics, Vol. 2014, Iss. 05, Num. 27 (2014)  
10.1088/1475-7516/2014/05/027

Fröb, M.B.; Roura, A.; Verdaguer, E.  
Riemann correlator in de Sitter including loop corrections form conformal fields. Article.  
Journal Of Cosmology And Astroparticle Physics, Vol. 2014, Iss. 07, Num. 48 (2014)  
10.1088/1475-7516/2014/07/048

Quantum correlations and spatial localization in one-dimensional ultracold bosonic mixtures. Article.  
10.1088/1367-2630/16/10/103004

Garcia-March, M.A.; Julia-Díaz, B.; Astrakharchik, G.E.; Boronat, J.; Polls, A.  
Distinguishability, degeneracy, and correlations in three harmonically trapped bosons in one dimension. Article.  
Physical Review A, Vol. 90, Iss. 06, Num. 63605 (2014)  
10.113/PhysRevA.90.063605

Garriga, J.; Urakawa, Y.  
Holographic inflation and the conservation of ζ. Article.  
10.1007/JHEP06(2014)086

Gavela, M.B.; Gonzalez-Fraile, J.; Gonzalez-Garcia, M.C.; Merlo, L.; Rigolin, S.; Yepes, J.  
CP violation with a dynamical Higgs. Article.  
10.1007/JHEP10(2014)044

Gilli, R.; et al. (ICCUB: Iwasawa, K.)  
ALMA reveals a warm and compact starburst around a heavily obscured supermassive black hole at z = 4.75. Article.  
10.1051/0004-6361/201322892

Gil-Marín, H.; Wagner, Ch.; Noreña, J.; Verde, L.; Percival, W.  
Dark matter and halo bispectrum in redshift space: theory and applications. Article.  
Journal Of Cosmology And Astroparticle Physics, Vol. 2014, Iss. 12, Num. 29 (2014)  
10.1088/1475-7516/2014/12/029

Girart, J.M.; Estalella, R.; Palau; A.; Torrelles, J.M.; Rao, R.  
On the origin of the molecular outflows in IRAS 16293-2422: SMA observations. Article.  
10.1088/2041-8205/780/1/L11

Gontcho A Gontcho, S.; Miralda-Escudé, J.; Busca, N.G.  
On the effect of the ionizing background on the Lyman alpha forest autocorrelation function. Article.  
10.1093/mnras/stu860
Gonzalez-Garcia, M. C.; Maltoni, M.; Schwetz, T.  
Updated fit to three neutrino mixing: status of leptonic CP violation. Article.  
10.1007/JHEP11(2014)052

Gonzalez-Garcia, M.C.; Halzen, F.; Niro, V.  
Reevaluation of the prospect of observing neutrinos from Galactic sources in the light of recent results in gamma ray and neutrino astronomy. Article.  
10.1016/j.astropartphys.2014.04.001

Grass, T.; Raventos, D.; Lewenstein, M.; Julia-Diaz, B.  
Quantum Hall Phases of two-component bosons. Article.  
10.1103/PhysRevB.89.045114

Graß, T.; Julia-Diaz, B.; Lewenstein, M.  
Topological phases in small quantum Hall samples. Article.  
Physical Review A, Vol. 89, Iss. 01, Num. 13623 (2014)  
10.1103/PhysRevA.89.013623

KROME—a package to embed chemistry in astrophysical simulations. Article.  
10.1093/mnras/stu114

Hales, A. S.; et al. (ICCUB: Torrelles, J. M.)  
A CO survey in planet-forming disks: Characterizing the gas content in the epoch of planet formation. Article.  
10.1088/0004-6256/148/3/47

Heavens, A.; Jimenez, R.; Verde, L.  
Standard Rulers, Candles, and Clocks from the Low-Redshift Universe. Article.  
10.1103/PhysRevLett.113.241302

Herrero, E.; Ribas, I.; Jordi, C.  
Correcting EChO data for stellar activity by direct scaling of activity signals. Article.  
Experimental Astronomy, Vol. temp, Iss. 18, Num. (2014)  
10.1007/s10686-014-9387-0

Iblisdir, S.; Cirio, M.; Boada, O.; Brennen, G.K.  
Low depth quantum circuits for Ising models. Article.  
10.1016/j.aop.2013.11.001

Iblisdir, S.  
Simulated annealing for tensor network states. Article.  
10.1088/1367-2630/16/10/103022

Jaén, X.; Molina, A.  
Homothetic motions and Newtonian cosmology. Article.  
10.1007/s10714-014-1745-8

Juan, E.; Salvador-Solé, E.; Domènech, G.; Manrique, A.  
Fixing a rigorous formalism for the accurate analytic derivation of halo properties. Article.  
10.1093/mnras/stt2493

Juan, E.; Salvador-Solé, E.; Domènech, G.; Manrique, A.  
Halo mass definition and multiplicity function. Article.  
10.1093/mnras/stu187

Latorre, J.I.; Sierra, G.  
Quantum computation of prime number functions. Article.  

Lee, K.G.; et al. (ICCUB: Arinyo, A.)  
Lyman-α forest tomography from background galaxies: The first megaparsec-resolution large-scale structure map at $z > 2$. Article.  
10.1088/2041-8205/795/1/L12

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)  
Antideuteron production in $\Upsilon(nS) \rightarrow q\bar{q}$ at $\sqrt{s} = 10.58$ GeV. Article.  
Physical Review D, Vol. 89, Iss. 11, Num. 111102 (2014)  
10.1103/PhysRevD.89.111102

Herrero, E.; Ribas, I.; Jordi, C.  
Antideuteron production in $\Upsilon(nS) \rightarrow q\bar{q}$ at $\sqrt{s} = 10.58$ GeV. Article.  
Physical Review D, Vol. 89, Iss. 11, Num. 111102 (2014)  
10.1103/PhysRevD.89.111102
Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Bottomonium spectroscopy and radiative transitions involving the χcJ(1P2P) states at BABAR. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Dalitz plot analysis of η → K+K− and ηc → K+K−π0 in two-photon interactions. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Evidence for the baryonic decay B0 → D0π. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Evidence for the decay B0 → ωω and search for B0 → ωφ. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Measurement of Collins asymmetries in inclusive production of charged pion pairs in e+e− annihilation at BABAR. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Measurements of direct CP asymmetries in B → Xγ decays using sum of exclusive decays. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Measurement of the B → Xℓ+ℓ− Branching Fraction and Search for Direct CP Violation from a Sum of Exclusive Final States. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Search for a Dark Photon in e+e− Collisions at BaBar. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Search for lepton-number violating B+ → Xττ+ decays. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Search for new π0-like particles produced in association with a τ-lepton pair. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
Study of the reaction e+e− → ψ(2S)π− via initial-state radiation at BaBar. Article.

Lees, J. P.; et al. (BaBar Collaboration; ICCUB: Grauges, E.)
The Physics of the B Factories. Article.

Leistedt, B.; Peiris, H.V.; Verde, L.
No new cosmological concordance with massive sterile neutrinos. Article.

Li, B.A.; Ramos, A.; Verde, G.; Vidana, I.
Topical issue on nuclear symmetry energy. Article.

Li, B.A.; Ramos, A.; Verde, G.; Vidana, I.
Topical issue on nuclear symmetry energy. Editorial.

Lian, Y.; Gómez, G.; Masdemont, J.J.; Tang, G.
Station-keeping of the real Earth–Moon libration point orbits using discrete-time sliding mode control. Article.

Lizzi, F.; Vitale, P.

Llovet, X.; Powell, C.J.; Salvat, F.; Jablonski, A.

López-Corredoira, M.; Abedi, H.; Garzón, F.; Figueras, F.

Mehtar-Tani, Y.; Tywoniuk, K.

Melvin, T.; et al. (ICCUB: Casteels, K.R.V.)

Merle, A.; Niro, V.; Schmidt, D.

Monguió, M.; Figueras, F.; Grosbøl, P.

Munar-Adrover, P.; Paredes, J.M.; Ribó, M.; Iwasawa, K.; Zabalza, V.; Casares, J.

Neves, L.P.; Perini, A.P.; Fernandez-Varea, J.M.; Cassola, V.F.; Kramer, R.; Khoury, H.J.; Caldas, L.V.E.

Notari, A.; Quartin, M.; Catena, R.
*CMB Aberration and Doppler Effects as a Source of...*


Pontzen, A.; Bird, S.; Peiris, H.; Verde, L.
Constraints on ionizing photon production from the large-scale Lyman alpha forest. Article.

Prieto, J.; Jimenez, R.; Verde, L.
Overcooled haloes at $z \geq 10$: a route to form low-mass first stars. Article.

Haibo, Q.; Julia-Díaz, B.; Garcia-March, M.A.; Polls, A.
Measure synchronization in quantum many-body systems. Article.

Reggiani, M.; et al. (ICCUB: Torrelles, J.M.)
Discovery of a companion candidate in the HD 169142 transition disk and the possibility of multiple planet formation. Article.

Absolute asymmetric synthesis in enantioselective autocatalytic reaction networks: Theoretical games, speculations on chemical evolution and perhaps a synthetic option. Review.

Richichi, A.; Fors, O.; Cusano, F.; Ivanov, V.D.
Final binary star results from the ESO VLT lunar occultations program. Article.

Riera, A.; Velázquez, P.F.; Raga, A.C.; Estalella, R.; Castrillón, A.
New light on the multiple jets of CRL 618. Article.

Rios, A.; Polls, A.; Dickhoff, W.
Density and isospin-asymmetry dependence of high-momentum components. Article.

Robin, A.C.; Reyle, C.; Fliri, J.; Czekaj, M.; Robert, C.P.; Martins, A.M.M.
Constraining the thick disc formation scenario of the Milky Way. Article.
Astronomy and Astrophysics, Vol. 569, Num. (2014) 10.1051/0004-6361/201423415

Roca-Fàbrega, S.; Antoja, T.; Figueras, F.; Valenzuela, O.; Romero-Gómez, M.
A novel method to bracket the corotation radius in galaxy disks: vertex deviation maps. Article.

Rodríguez-Gasén, R.; Aran, A.; Sanahuja, B.; Jacobs, C.; Poeds, S.
Variation of proton flux profiles with the observer’s latitude in simulated gradual SEP events. Article.

Ruiz-Lapuente, P.
New approaches to SNe Ia progenitors. Article.

Russo, J.G.
$N=2$ gauge theories and quantum phases. Article.

Salazar, F.; Masdemont, J.J.; Gómez, G.; Winter, A.

Samushia, L.; et al. (ICCUB: Cuesta, A.J.)

Sanchez, A.G.; et al. (ICCUB: Cuesta, A.J.)
The clustering of galaxies in the SDSS-III Baryon Oscillation Spectroscopic Survey: cosmological implications
Simmons, B.D.; et al. (ICCUB: Casteels, K.R.V.)
Galaxy Zoo: CANDELS barred discs and bar fractions. Article.
10.1093/mnras/stu1817

Solà, J.
Dark matter, dark energy and the time evolution of masses in the Universe. Review.
10.1142/S0217751X14440163

Solà, J.
Entropic-force dark energy reconsidered. Article.
10.1103/PhysRevD.90.023008

Rapidly increasing collimation and magnetic field changes of a protostellar H2O maser outflow. Article.
10.1051/0004-6361/201423877

Tanaka, T.; Urakawa, Y.
Strong restriction on inflationary vacua from the local gauge invariance III: Infrared regularity of graviton loops. Article.
Progress of Theoretical and Experimental Physics, Vol. 2014, Iss. 07, Num. 073E01 (2014)
10.1093/ptep/ptu071

Tapiador, D.L; O’Mullane, W.; Brown, A.; Luri, X.; Huedo, E.; Osuna, P.
A Framework for Building Hypercubes Using MapReduce. Article.
Computer Physics Communications, Vol. 185, Iss. 05, p. 1429–1438 (2014)
10.1016/j.cpc.2014.02.010

Tarrio, J.; Varela, O.
Electric/magnetic duality and RG flows in AdS4/CFT3. Article.
10.1007/JHEP01(2014)071

Tarrio, J.
Transport properties of spacetime-filling branes. Article.
10.1007/JHEP04(2014)042

Tojeiro, R.; et al. (ICCUB: Cuesta, A.J.)
10.1093/mnras/stu371

A delayed transition to the hard state for 4U 1630–47 at the end of its 2010 outburst. Article.
10.1088/0004-637X/791/1/70

A very young, compact bipolar H2O maser outflow in the intermediate-mass star-forming LkHα 234 region. Article.
10.1093/mnras/stu847

Torrelles, J.M.; Trinidad, M.; Curiel, S.; Estalella, R.; Patel, N.; Gómez, J.F.; Anglada, G.; Carrasco-González, C.; Cantó, J.; Raga, A.C.; Rodríguez, L.F.
Multi-epoch VLBA H2O maser observations toward the massive YSOs AFGL 2591 VLA2 and VLA3. Article.
10.1093/mnras/stt2177

Tywoniuk, K.
Is there jet quenching in pPb?. Article in Press.
10.1016/j.nuclphysa.2014.04.023

Uscanga, L.; Gomez, J.F.; Miranda, L.F.; Bounis, P.; Suarez, O.; Torrelles, J.M.; Anglada, G.; Tafoya, D.
H2O maser emission associated with the planetary nebula IRAS 16333–4807. Article.
Valero, G.; Ribó, J.M.; Moyano, A.
*A closer look at spontaneous mirror symmetry breaking in aldol reactions*. Article.
10.1002/chem.201404497

Vargas-Magaña, M.; et al. (ICCUB: Cuesta, A.J.)
10.1093/mnras/stu1681

*The bias of weighted dark matter haloes from peak theory*. Article.
10.1093/mnras/stu1164

Vignali, C.; Mignoli, M.; Gilli, R.; Comastri, A.; Iwasawa, K.; Zamorani, G.; Mainieri, V.; Bongiorno, A.
*The space density of Compton-thick AGN at z = 0.8 in the zCOSMOS–Bright Survey*. Article.
10.1051/0004-6361/201424791

Viñals, X.; Centelles, M.; Roca-Maza, X.; Warda, M.
*Density dependence of the symmetry energy from neutron skin thickness in finite nuclei*. Article.
10.1140/epja/i2014-14027-8

Warda, M.; Centelles, M.; Viñals, X.; Roca-Maza, X.
*Influence of the single-particle structure on the nuclear surface and the neutron skin*. Article.
10.1103/PhysRevC.89.064302

Wootton, J.R.; Burri, J.; Iblisdir, S.; Loss, D.
*Decoding non-Abelian topological quantum memories*. Article.
10.1103/PhysRevX.4.011051
Aharonian, F.A.; Rieger, F.M.; Paredes, J.M.; Romero, G.E. 
High energy phenomena in relativistic outflows (HEPRO IV). Editors.

Álvarez-Gaumé, L.; Gómez, C.; Jimenez, R.
Initial conditions for inflation and the energy scale of SUSY-breaking from the (nearly) gaussian sky. Conference Paper.

Ambrosi, G.; et al. (CTA consortium; ICCUB: Gascon, D; Paredes, J.M.; Ribó, M.; Sanuy, A.)
10.1117/12.2054605

Andrianov, A.; Espriu, D.; Andrianov, V.; Kolevatov, S.

Andrianov, A.A.; Espriu, D.; Kurkov, M.A.; Lizzi, E
Universal Landau Pole at the Planck scale. Article.

Bernal, A.; Codina, J.M.; Núñez, J.; Torras, N.
Minor Planets and Comets Circulars (MPC), IAU, p. 86778-86778 (2014)

Bernal, A.; Codina, J.M.; Núñez, J.; Torras, N.
Minor Planets and Comets Circulars (MPC), IAU, p. 87200-87200 (2014)


Carmona, M.; et al. (ICCUB: Gomez, J.M.; Roma, D.; Casas, A.; Sabater, J.)

Casas, A.; et al. (ICCUB: Roma, D.; Gomez, J.M.; Sabater, J.)
Electronics design for a high precision image stabilization system. Conference Paper.

Cuchi, J.E.; Molina, A.; Ruiz, E.

Eikenberry, S.S.; et al. (ICCUB: Sabater, J.; Gomez, J.M.; Torra, J.)

Espriu, D.

Feijoo, A.; Magas, V.K.; Ramos, A.
Antikaon induced Cascade production from a chiral model at NLO. Conference Paper.
EPJ Web of Conferences, Vol. 81, Iss. 5012 (2014) 10.1051/epjconf/20148105012

Feroci, M.; et al. (LOFT consortium; ICCUB: Iwasawa, K.; Migliari, S.; Paredes, J.M.; Portell, J.; Ribó, M.)
The Large Observatory for x-ray timing. Conference Paper.

Gonzalez-Garcia, M.C.
10.1016/j.dark.2014.04.002

Gridnev, K.A.; Tarasov, V.N.; Gridnev, D.K.; Tarasov, D.V.; Viñas, X.; Greiner, W.

Heynderickx, D.; Aran, A.; Lei, F.; Sanahuja, B.; Truscott, P.; Vainio, R.

Inome, Y.; et al. (ICCUB: Gascon, D.; Paredes, J.M.; Ribó, M.; Sanuy, A.)
Development of the camera for the large size telescopes of the Cherenkov Telescope Array. Conference Paper.
10.1117/12.2054619

Jordi, C.; Masana, E.
The physical characterization of the stars. Conference Paper.
Lecture Notes and Essays in Astrophysics. III After the 3rd Astrophysics Symposium, During the 31st Scientific Biannual Meeting of the Royal Spanish Physical Society, RSEF 2007 p. 33-44 (2014)

Llosa, J.
10.1007/978-3-642-40157-2_42

Radiation tolerant SPI-programmable delay line for high energy physics experiments. Conference Paper.
10.1109/ISCAS.2014.6865249

Minor Planets and Comets Circulars (MPC), UIA, p. 86533-86534 (2014)

Palacio, F.; Prades, J.D.; Gomez, J.M.; Martinez, M.; Errachid, A.; Lopez, M.
A new low power instrument for impedance measurements in biomedicine based on FFT. application to interleukin-10 protein detection. Conference Paper.
Procedia Engineering, Vol. 87, p. 312-315 (2014)
10.1016/j.proeng.2014.11.670

Paredes-Fortuny, X.; Ribó, M.; Fors, O.; Núñez, J.; Bosch-Ramon, V.
Optical Photometric Monitoring of LS +61 303. Article.
10.1142/S2010194514601975

Parreño, A.
10.1063/1.4891137

Perez-Obiol, A.; Entem, D.R.; Julia-Diaz, B.; Parreño, A.
Non-mesonic weak decay of hypernuclei with effective field
10.1088/1742-6596/503/1/012033

Ramos, A.; Oset, E.
Vector meson-baryon dynamics in photoproduction reactions around 2 GeV. Conference Paper.
EPJ Web of Conferences, Vol. 81 (2014)
10.1051/epjconf/20148105023

Roca-Maza, X.; et al. (ICCUB: Centelles, M.; Viñas, X.)
10.1051/epjconf/20146602092

Romero-Gomez, M.; Sanchez-Martin, P.; Masedmont, J.J.
Com les varietats invariants formen espirls i anells en galaxies barrades. Review
Butlletí de la Societat Catalana de Matemàtiques, Vol. 29, Iss. 1, p. 51-75 (2014)
10.2436/20.2002.01.53

Russo, J.G.; Zarembo, K.
Localization at Large N. Conference Paper.
10.1142/9789814616850_0015

Russo, J.G.
10.1063/1.4891156

Sabater, J.; Gomez, J.M.; Lopez, M.; Torra, J.; Raines, S.N.; Eikenberry, S.S.
Kinematic modeling and path planning for MIRADAS arms. Conference Paper.
10.1117/12.2055466

Solà, J.
Vacuum energy and cosmological evolution. Review.

10.1063/1.4891113

Investigation of the properties of nuclei with extreme neutron excess in the vicinity of neutron magic numbers. Article.
10.3103/S1062873814070235

10.1088/1742-6596/562/1/012010

Verde, L.; Protopapas, P.; Jimenez, R.
The expansion rate of the intermediate universe in light of Planck. Article.
10.1016/j.dark.2014.09.003

Viñas, X.; Baldo, M.; Burgio, G.F.; Centelles, M.; Robledo, L.M.; Sharma, B.K.

Viñas, X.; Centelles, M.; Roca-Maza, X.; Warda, M.
Density dependence of the nuclear symmetry energy from measurements of neutron radii in nuclei. Conference Paper.

Viñas, X.; Centelles, M.; Roca-Maza, X.; Warda, M.
Density dependence of the nuclear symmetry energy from measurements of neutron radii in nuclei. Conference Paper.
II Russian-Spanish Congress on Particle and Nuclear Physics at all Scales, Astroparticle Physics and Cosmology (2014)
Antiche, E.; Borraчero, R.; Clotet, M.; Castañeda, J.
Gaia Operational Complete Source Statistics, IGSL

Antiche, E.
GATCore A.1 Software Release Note
GAIA–C9–SP–UB–ELA–006–1 (may–14)

Antiche, E.; Borraчero, R.; Julbe, F.; Castañeda, J.;
Clotet, M.; Fries, A.; Luri, X.

Antiche, E.; Borraчero, R.; Julbe, F.
Description and usage of the GATCompleteSource
connector

Antiche, E.; Borraчero, R.; Julbe, F.; Castañeda, J.;
Clotet, M.; Fries, A.; Luri, X.
Gaia Object Generator Statistics not considering
calibration noise – version 11
GAIA–C2–TN–UB–ELA–015 (may–14)

Antiche, E.; Borraчero, R.; Julbe, F.; Castañeda, J.;
Clotet, M.; Fries, A.; Luri, X.
Gaia Universe Model Statistics – version 11 Functions

Antiche, E.; Castañeda, J.; Fabricius, C.
GAT Statistics for the new Attitude Star catalogue

Antiche, E.; Castañeda, J.; Fabricius, C.
GAT Statistics for the old Attitude Star Catalogue – IGSL

Antiche, E.
GAT 13.0 Software Release Note

Antiche, E.
GATCompleteSourceConnector A.1 Software Release Note

Antiche, E.; Borraчero, R.; Martinez, O.; Issasi, Y.; Luri, X.
Description and usage of the GATCore library
GAIA–C9–UG–UB–ELA–007–1 (may–14)
5. PUBLICATIONS

Castañeda, J.
*TmTools 16.0 Software Release Note*
GAIA–C1–SP–UB–JC–068–01 (may–14)

Castañeda, J.; Clotet, M.; Portell, J.; et al.
*DPCB Development Plan*

Castañeda, J.
*Intermediate Data Updating 17.0 Software Release Note.*

Clotet, M.; Gonzalez, J.
*Dpctools 16.1 Software Test Report*

Clotet, M.
*DPCB Commissioning Briefings*

Clotet, M.; Castañeda, J.; Portell, J.; Gonzalez, J.
*DPCB Progress Report #10 (Cycle 15) [2013–07–01 to 2013–12–31]*

Clotet, M.; Gonzalez, J.
*Dpctools 16.1 Software Release Note*
GAIA–DB–SP–UB–MCL–022–02 (jul–14)

Clotet, M.; Gonzalez, J.
*Dpctools 17.1 Software Release Note*

Clotet, M.; Portell, J.; Castañeda, J.
*DPCB Progress Report #11 (Ops 01) [2014–01–01 to 2014–09–01]*

Clotet, M.; Gonzalez, J.
*DPCB Data Manager*

Clotet, M.; Portell, J.
*DPCB QA Report – 2014/07*

Els, S., CU–, DPC–, and work–group leaders (ICCUB: Castañeda, J.; Luri, X.)
*DPAC Management Report #7*

Els, S., PO members (ICCUB: Gracia, G.)
Gonzalez, J.; Garralda, N.; Castañeda, J.; Portell, J.
IDT 17.0 Software Test Report at DPCB–CESCA
GAIA-C3-TR-UB-JG-026-02 (jul-14)

Gonzalez, J.; Garralda, N.; Castañeda, J.; Portell, J.
IDT 16.0 Software Test Report at DPCB–CESCA
GAIA-C3-TR-UB-JG-023-04 (jun-14)

González, J.; Clotet, M.; Castañeda, J.; Portell, J.
DPCB Test Report for Cycle 16 (STR)

González, J.; Clotet, M.; Castañeda, J.; Portell, J.
DPCB Test Report for Cycle 17 (STR)

González, J.; Clotet, M.
DpcbTools 16.0 Software Release Note (SRN)

González, J.; Clotet, M.
DpcbTools 16.0 Software Test Report (STR)

Jordi, C.
Photometric relationships between Gaia photometry and existing photometric systems
GAIA-C5-TN-UB-CJ-041 (Jun-14)

Jordi, C.
Photometric relationships between Gaia photometry and existing photometric systems
GAIA-C5-TN-UB-CJ-041-9 (Jun-14)

Gracia, G.; Salgado, J.; Pancino, E.; Marrese, P.
WP950 System Requirement Specifications
GAIA-C9-SP-ESAC-GGA-031 (Apr-14)

Guerra, R.; Portell, J.; Blagorodnova, N.
IDT Software Test Specification
GAIA-C3-SP-ESAC-RG-012-09 (Apr-14)

O’Mullan, W.; et al. (ICCUB: Gracia, G.)
Commissioning and beyond Gaia science ground segment status
GAIA-C1-PR-ESAC-WOM-089-01 (Jul-14)

Gracia, G.; Frezoulis, B.; Els, S.
Minutes of CU1 Meeting #17 and DPCs OR5 Preparation Meeting
GAIA-C1-MN-ESA-GGA-033 (Jul-14)

Gracia, G.; Luri, X.
Minutes of the 1st Gaia Archive WS
GAIA-C9-MN-ESAC-GGA-030 (Jan-14)

O’Mullan, W.; Luri, X.; Gracia, G.
CU9 software development plan
GAIA-C9-PL-ESAC-WOM-086 (Jan-14)

Gracia, G.
Gaia Routine Planning Meeting #7 - minutes
GAIA-DE-MN-ESAC-GGA-034 (Sep-14)

Portell, J.; Castañeda, J.; Fabricius, E., et al.
Detailed IDT Planning for Launch and beyond
GAIA-C3-TN-UB-JP-060-03 (Jan-14)
Portell, J.; et al. (ICCUB: Castañeda, J.; Garralda, N.; Fabricius, C.; Torra, J.)
*IDTools 16.0 Software Release Note*  
GAIA-C3-SP-UB-JP-066-05 [jun-14]

Portell, J.; Clotet, M.; Blagorodnova, N.
*DPCB Requirements Specification*  
GAIA-DB-SP-UB-JP-038-03 [oct-14]

Portell, J.; et al. (ICCUB: Castañeda, J.; Garralda, N.; Fabricius, C.; Torra, J.)
*IDT 17.0 Software Release*  
GAIA-C3-SP-UB-JP-068-02 [jul-14]

Portell, J.; et al. (ICCUB: Castañeda, J.; Garralda, N.; Fabricius, C.; Torra, J.)
*IDT 16.0 Software Release Note*  
GAIA-C3-SP-UB-JP-065-05 [jun-14]

Portell, J.; et al. (ICCUB: Castañeda, J.; Garralda, N.; Fabricius, C.; Torra, J.)
*IDT 15.1 Software Release Note*  
GAIA-C3-SP-UB-JP-064-14 [mar-14]

Vallenari, A.; Bragaglia, A.; Marrese, P.; Jordi, C.; Soubiran, C.; Sordo, R.  
*Interface Control Document for GWP947 Observational Auxiliary*  
GAIA-C9-SP-OAPD-AV-012-0 [jun-14]

Vallenari, A.; Bragaglia, A.; Sordo, R.; Soubiran, C.; Jordi, C.; Balaguer, L.; Pancino, E.; Marrese, P.; Arenou, F.  
*GWP-947 Auxiliary data*  
GAIA-C9-SP-OAPD-AV-013-0 [jun-14]

van Leeuwen, F.; et al. (ICCUB: Jordi, C.)  
*CU5 internal report 2014.01*  
GAIA-C5-PR-IOA-FVL-122 [feb-14]

van Leeuwen, F.; et al. (ICCUB: Jordi, C.)  
*CU5 internal report 2014.02*  
GAIA-C5-PR-IOA-FVL-124 [mar-14]

van Leeuwen, F.; et al. (ICCUB: Jordi, C.)  
*CU5 internal report 2014.03*  
GAIA-C5-PR-IOA-FVL-126 [abr-14]

Voss, H.; Muinonen, K.; de Bruijne, J.  
*Request for BRDF measurements of Gaia Sunside MLI*  
GAIA-CH-TN-UB-HV-025 [sep-14]

Voss, H.; Jordi, C.; Fabricius, C.; de Bruijne, J.  
*Optimizing the gating strategy for AF*  
GAIA-CH-TN-UB-HV-022-2 [jul-14]

Voss, H.; Jordi, C.; Fabricius, C.; de Bruijne, J.  
*Optimizing the gating strategy for BP and RP*  
GAIA-CH-TN-UB-HV-023-2 [jul-14]

Voss, H.; Jordi, C.  
*Photometric performances estimates with straylight*  
GAIA-C5-TN-UB-CJ-052-2D [mar-14]
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Director/s: Jordi Miralda Escudé

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Author: Zubin Philip Olikara
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<table>
<thead>
<tr>
<th>Thesis Title</th>
<th>Author</th>
<th>Director/s</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>AdS</em> _5* Gravitational wave on a Domain-wall*</td>
<td>Nikola Gustarov</td>
<td>David Mateos</td>
<td>07/02/2014</td>
</tr>
<tr>
<td>Automatic reduction of GEO survey data</td>
<td>Lluís Canals</td>
<td>Jorge Núñez</td>
<td>05/09/2014</td>
</tr>
<tr>
<td>Cold bosons in optical lattices: an exact diagonalization study</td>
<td>David Raventós</td>
<td>Bruno Juliá, Tobias Grass (ICFO)</td>
<td>/07/2014</td>
</tr>
<tr>
<td>Constraining the high-mass end of the stellar IMF using galactic Cepheids</td>
<td>Roger Mor</td>
<td>Francesca Figueras</td>
<td>05/09/2014</td>
</tr>
<tr>
<td>Dynamical vacuum energy, inflation and cosmic evolution</td>
<td>Laura Cervantes</td>
<td>Joan Solà</td>
<td>07/02/2014</td>
</tr>
<tr>
<td>Efficiency and background studies of the <em>K</em> ( \rightarrow e e \pi \pi ) stripping line at LHCb</td>
<td>Mar Barrio</td>
<td>Lluís Garrido</td>
<td>08/09/2014</td>
</tr>
<tr>
<td>Hyperons in strongly magnetized neutron stars</td>
<td>Jorge Lerendegui Marco</td>
<td>Àngels Ramos, Laura Tolós (ICE-CSIC)</td>
<td>16/10/2014</td>
</tr>
<tr>
<td>Image data compression with a Hierarchical Pixel Averaging algorithm and FAPEC</td>
<td>Riccardo Iudica</td>
<td>Enrique Garcia-Berro; Jordi Portell</td>
<td>06/07/1905</td>
</tr>
<tr>
<td>Improvement of DWTFAPEC: applications and tests</td>
<td>Hamed Ahmadloo</td>
<td>Enrique Garcia-Berro; Jordi Portell</td>
<td>06/07/1905</td>
</tr>
<tr>
<td>Nuclei of greatest impact on the composition of neutron-star outer crusts</td>
<td>Irene Dedes</td>
<td>Mario Centelles</td>
<td>22/09/2014</td>
</tr>
<tr>
<td>Observing the shadowing of the Cosmic Ray electron flux by the Moon with the MAGIC telescopes: a feasibility study</td>
<td>Daniel Guberman</td>
<td>Valentí Bosch-Ramon (tutor: Abelardo Moralejo, IFAE)</td>
<td>05/09/2014</td>
</tr>
<tr>
<td>Open clusters as seen by Gaia</td>
<td>Javier Río</td>
<td>Carme Jordi</td>
<td>05/09/2014</td>
</tr>
<tr>
<td>Quantum Forces in Solids with Two-State Systems at finite temperature</td>
<td>Nahuel Statuto</td>
<td>J. Tejada (U. Barcelona) (tutor: Joan Soto)</td>
<td>08/09/2014</td>
</tr>
<tr>
<td>Starobinski inflation vs. Starobinski inflation</td>
<td>Luis Guardado</td>
<td>Enric Verdaguer</td>
<td>08/09/2014</td>
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<td>Strong baryon-baryon interaction in the strangeness -3 sector</td>
<td>Martí Florit Gual</td>
<td>Assumpta Parreño, Àngels Ramos</td>
<td>16/10/2014</td>
</tr>
<tr>
<td>The Crab Pulsar at high- and very high-energies with the Fermi/LAT and MAGIC telescopes</td>
<td>Daniel Galindo</td>
<td>Roberta Zanin (tutor: Marc Ribó)</td>
<td>05/02/2014</td>
</tr>
</tbody>
</table>
The mean metal line spectrum of Damped Lyman-σ Systems (DLAs) in BOSS
Author: Lluís Mas
Director/s: Jordi Miralda
Date: 02/07/2014

Tonks-Girardeau gases in different trapping potentials
Author: Abel Vicenç Yuste
Director/s: Miguel A. Garcia-March, Artur Polls
Date: 23/07/2014

Top Mass Determination by Montecarlo Generator
Author: Daniel Moreno
Director/s: Federico Mescia
Date: 07/02/2014

Variability analysis of Gaia calibration candidate SPSS034 from Joan Oró Telescope data
Author: José Luis Chica
Director/s: Carme Jordi (tutor: Josep M.Carrasco)
Date: 02/07/2014
ACTIVITIES

ICCUB COLLOQUIA

The ICCUB Colloquium Series consist of institute-wide talks given by invited speakers. These talks are directed to a diverse audience, including not only ICCUB members and external researchers but also grade students.

Colloquium Commission

- Bartomeu Fiol
- Bruno Julià
- Federico Mescia
- Paolo Padoan

2014 ICCUB Colloquia

Michele Trenti (Univ. Cambridge)
*Stars and Galaxies in the First Billion Years after the Big Bang*
10/02/2014

Nora Brambilla (TUM)
*Quarkonium with Effective field theories*
03/03/2014

Giovanni Cantatore (Univ. Trieste and INFN – Trieste)
*Hunting for Axions and WISPs with cutting-edge sensors*
20/05/2014

Denis Barkats (ALMA Science Center, Chile)
*Detection of B-mode polarization at degree angular scales using BICEP2*
30/05/2014

Mark Alford (Dept. Physics, Univ. Washington)
*Superconducting Quarks: Condensed Matter in the Heavens*
30/06/2014

David d'Enterria (CERN)
*Impact of LHC results on particle astrophysics (ultra-high-energy cosmic rays & dark matter)*
ICC Colloquium
10/11/2014

Mario Livio (Space Telescope Science Institute)
*Brilliant Blunders*
27/11/2014

SEMINARS

Seminars are more specialized talks given by either ICCUB members or visitors.

We distinguish those seminars organized directly by the institute (ICCUB Seminars), and group seminars organized in collaboration with UB departments:

- High Energy Physics Group (HEP),
- Atomic, Molecular and Nuclear Physics Group (FAN),
- Department of Astronomy and Meteorology (DAM).

2014 Seminars

Ricardo Carmona, Ángel Rodríguez (CNM-IMSE)
*CMOS Smart Image and Vision Sensors*
ICC Seminar
10/01/2014

Julian Sitarek (IFAE)
*What gamma-ray observations can tell us about intergalactic magnetic fields?*
ICC Seminar
17/02/2014
Stéphane Corbel (Univ. Paris Diderot & CEA Saclay)
A panchromatic overview of accreting binary systems and their associated relativistic jets
ICC Seminar
28/04/2014

Héctor Gil-Marín (Institute of Cosmology & Gravitation, Univ. Portsmouth)
Measuring the galaxy bias, gravity and sigma_8 using the bispectrum technique
ICC Seminar
31/07/2014

Camille Avestruz (Yale Univ. & Yale Center for Astronomy and Astrophysics)
Cosmological Simulations of Galaxy Cluster Outskirts
ICC Seminar
10/11/2014

Mireia Montes (IAC)
Age and metallicity gradients support hierarchical formation for M87
DAM Colloquium
31/01/2014

Vibor Jelic (Kapteyn Astronomical Institute, Univ. Groningen & Netherlands Institute for Radio Astronomy)
The LOFAR-Epoch of Reionization experiment: towards the first stars in the Universe
DAM Seminar
13/03/2014

Martin López-Corredoira (Inst. de Astrofísica de Canarias)
The Twilight of the Scientific Age
DAM Seminar
24/04/2014

Natalia Lewandowska (Wuerzburg Univ.)
Giant Pulse Radio Emission From The Crab Pulsar
DAM Seminar
06/05/2014

Jerome Bouvier (IPAG, Grenoble)
Angular momentum evolution of low-mass stars and brown dwarfs: observations and models
DAM Seminar
03/06/2014

Franco Giovannelli (Istituto di Astrofisica e Planetologia Spaziali, Roma)
The Prototype of Transient X-ray Sour-ces A0535+26/HDE245770: Time Delay between Optical and X-ray flares
DAM Colloquium
20/06/2014

David W. J. Thompson (Dept. Atmospheric Science, Colorado State Univ.)
Climate change and midlatitude Weather
DAM Colloquium
09/07/2014

Eric Gotthelf (Columbia Astrophysics Laboratory, Columbia Univ.)
What is powering HESS J1640-465, the Most Luminous Galactic TeV Source?
DAM Colloquium
14/07/2014

David W. J. Thompson (Dept. Atmospheric Science Colorado State Univ.)
Periodicity in the midlatitude atmospheric circulation
DAM Seminar
16/07/2014

Giacomo Monari (Kapteyn Astronomical Institute, Groningen)
The dynamical effects of the bar on the Galactic thin and thick Disks
DAM Seminar
08/10/2014

David Valls-Gabaud (CNRS, Observatoire de Paris)
The MESSIER satellite: unveiling galaxy formation
DAM Seminar
14/11/2014

Laurent Loinard (Centro de Radioastronomía y Astrofísica, UNAM, México)
Tomography of star-forming regions with VLBI radio interferometers
DAM Seminar
28/11/2014

Fabio Anulli (INFN Rome)
Measurement of exclusive hadronic cross sections via Initial State Radiation
HEP Seminar
04/02/2014

Pau Figueras (DAMTP Cambridge)
Localised plasmaballs and confinement/deconfinement in AdS/CFT
HEP Seminar
06/02/2014
Daniel Arean (MPI Munich)
Dirty Holographic Superconductors
HEP Seminar
13/02/2014

Doménc Espriu (ICCUB)
What can unitarity teach us about the Higgs?
HEP Seminar
14/02/2014

Daniel G. Figueroa (Geneva Univ.)
Imprints of the Standard Model in the Sky
HEP Seminar
20/02/2014

Arnab Kundu (ICCUB)
Aspects of Thermalization and the AdS/CFT Correspondence
HEP Seminar
21/02/2014

Guillermo Silva (La Plata)
Wilson loops in ABJM
HEP Seminar
27/02/2014

Maximilian Attems (ICCUB)
State of the art realtime dynamics of non-equilibrium anisotropic systems
HEP Seminar
28/02/2014

Antonio Vairo (TUM)
Non-relativistic particles in a thermal bath
HEP Seminar
04/03/2014

Vittorio Lubicz (Univ. Roma 3)
Light quark physics and lattice QCD
HEP Seminar
06/03/2014

Thomas Epelbaum (IPhT, Saclay)
Non-renormalizability of the classical-statistical approximation
HEP Seminar
11/03/2014

Paul Kuijer (NIKHEF & ALICE collaboration)
Recent results on Pb-Pb and p-Pb collisions from ALICE
HEP Seminar
13/03/2014

Albert Renau (ICCUB)
Photon propagation in a cold axion background and strong magnetic fields
HEP Seminar
14/03/2014

Pere Talavera (UPC & ICCUB)
The lowest scalar in QCD from low-energy data
HEP Seminar
21/03/2014

Alexander Rothkopf (U. Bern, AEC)
Heavy Quarkonium: A thermometer for the quark-gluon plasma
HEP Seminar
25/03/2014

Marina Martinez (ICCUB)
Black String Flow
HEP Seminar
28/03/2014

Norihiro Tanahashi (Tokyo U., IPMU & Cambridge U., DAMTP)
Dynamical Meson Melting in Holography
HEP Seminar
03/04/2014

David Mateos (ICCUB)
Far-from-equilibrium Holography and Heavy Ion Collisions
HEP Seminar
04/04/2014

Miguel Tierz (Univ. Complutense de Madrid)
Chern-Simons matrix models and 1/2-BPS Wilson loops in N=4 SYM theory
HEP Seminar
10/04/2014

Anton Faedo (ICCUB)
On the IR of holographic gauge theories at finite density
HEP Seminar
11/04/2014

Yuko Urakawa (IAR, Nagoya Univ. and UB)
dS/CFT and prospects on cosmology
HEP Seminar
24/04/2014

Xumeu Planells (ICCUB)
Parity breaking in heavy ion collisions
HEP Seminar
25/04/2014
Cristiano Germani (LMU Munich)
Cosmological consequences of non-standard gravitational interactions
HEP Seminar
25/04/2014

Jorge Zanelli (CECS Valdivia)
2+1 black hole with SU(2) hair
HEP Seminar
08/05/2014

Joaquim Gomis (ICCUB)
Conformal symmetry for relativistic point particles
HEP Seminar
09/05/2014

Glenn Barnich (Univ. Libre de Bruxelles)
BMS3 representations, Virasoro coadjoint orbits and holographic positive energy theorems in 3d gravity
HEP Seminar
15/05/2014

Jorge Russo (ICCUB)
Localization and Quantum phase transitions in N=2 supersymmetric theories
HEP Seminar
16/05/2014

Tommi Markkanen (Helsinki Univ.)
Applications of Curved Space Field Theory to Scalar Field Models of Inflation
HEP Seminar
22/05/2014

Joan Soto (ICCUB)
Nucleon-nucleon effective field theory with dibaryon fields
HEP Seminar
23/05/2014

Claudio Pica (CP3-Origins)
Composite Higgs Dynamics on the Lattice: Spectrum of SU(2) Gauge Theory with two Fundamental Fermions
HEP Seminar
29/05/2014

Tolga Altinoluk (Univ. Santiago de Compostela)
CGC beyond eikonal accuracy and its applications in pA collisions
HEP Seminar
04/06/2014

Antonino Flachi (IST, Lisbon)
Chiral Symmetry Breaking and Geometry
HEP Seminar
05/06/2014

Wolfgang Hollik (MPI Munich)
Higgs bosons and precision physics
HEP Seminar
12/06/2014

Andrea Puhm (UC Santa Barbara)
Metastability in Bubbling Geometries
HEP Seminar
13/06/2014

Philpe Mota (Frankfurt Univ.)
Event-by-event fluctuations and the correlation between early and late emitted particles
HEP Seminar
18/06/2014

Alfredo Urbano (SISSA)
Fingerprints of Dark Matter in the gamma-ray sky
HEP Seminar
19/06/2014

Ben Shlaer (Tufts Universit)
Unimodular gravity and the problem of time
HEP Seminar
20/06/2014

Keiju Murata (Keio Univ.)
Electric Field Quench in AdS/CFT
HEP Seminar
09/09/2014

Diego Hofman (Univ. Amsterdam)
Warped Conformal Field Theory and Non-AdS holography
HEP Seminar
18/09/2014

Konstantinos Sfetsos (Univ. Athens)
Spacetimes for lambda-deformations
HEP Seminar
02/10/2014

Benson Way (DAMTP, Cambridge Univ.)
The Characteristics of Lovelock Theories
HEP Seminar
16/10/2014
Roberto Emparan (ICCUB)
The large-D limit of General Relativity
HEP Seminar
24/10/2014

Guy E de Teramond (Univ. Costa Rica)
Baryon spectrum from superconformal quantum mechanics and its light-front holographic embedding
HEP Seminar
30/10/2014

José Ignacio Latorre (ICCUB)
Prime go Quantum
HEP Seminar
31/10/2014

Monica Guica (Uppsala Univ.)
Two Virasoro symmetries in stringy warped AdS3
HEP Seminar
06/11/2014

Kenji Fukushima (Tokyo Univ.)
Quarks in Glasma -- Particle Production with Magnetic Field
HEP Seminar
07/11/2014

Davide Meloni (Univ. Roma III)
A non-susy SO(10) model for the physics below MGUT
HEP Seminar
13/11/2014

Marjorie Schillo (Leuven Univ.)
Unwinding Inflation and Brane Dynamics
HEP Seminar
20/11/2014

Christiana Pantelidou (ICCUB)
Four-dimensional conformal field theories with a helical twist
HEP Seminar
21/11/2014

Stefano di Vita (MPI Munich)
Standard Model vacuum stability with a 125 GeV Higgs
HEP Seminar
04/12/2014

Guillermo Ballesteros (ICCUB)
The effective theory of fluids and dark energy
HEP Seminar
05/12/2014

César Gómez (IFT UAM & CSIC)
Towards a corpuscular approach to gravity and cosmology
HEP Seminar
10/12/2014

Spiros Basilakos (Academy of Athens)
Geometrodynamics in Cosmology
HEP Seminar
11/12/2014

Alessio Notari (ICCUB)
Hemispherical Power Asymmetry and Dipolar modulations in Planck CMB Data
HEP Seminar
12/12/2014

Antonio Cuesta & Licia Verde (ICCUB)
Climbing the cosmic distance ladder
HEP Journal club
16/12/2014

Jose Ademir Sales Lima (São Paulo Univ., Brazil)
Accelerating Universe, Dark Energy and Alternative Cosmologies: The Case for a Dynamical Λ-Term
HEP Seminar
18/12/2014

Alessandro Pastore (U. L. Bruxelles)
Nuclear matter response function with a central plus tensor landau interaction
FAN Seminar
24/04/2014

Luís Santos (Univ. Hannover)
Ultra-cold lattice gases with density-dependent hopping
FAN Seminar
15/05/2014

Fernando Sols (U. Complutense de Madrid)
Hawking radiation from sonic black holes in flowing atom condensates
FAN Seminar
03/07/2014

Albert Feijoo (ICCUB)
Cascade production in antikaon reactions with protons
FAN Seminar
10/07/2014

K.A. Gridnev (Univ. Saint Petersburgh)
Properties of the nuclei in the neighborhood of the neutron and proton drip lines
FAN Seminar
15/07/2014

Laszlo Csernai (Univ.e Bergen)
New collective processes in high energy heavy ion collisions
FAN Seminar
17/07/2014

A. Gridnev (Univ. Frankfurt)
Threshold Phenomena: Halos and Efimov states
FAN Seminar
22/07/2014

Steve Campbell (Queens Univ., Belfast)
Shortcuts to optimal control: the LMG model

At ICCUB

Graciani-Díaz, R.
Organization
DIRAC 4 EGI. Follow up mini-workshop
Facultat de Física, UB
13/03/2014

Graciani-Díaz, R.
Organization
DIRAC 4 ESFRIs H2020 INFRADERV-4 Initiative
Facultat de Física, UB
14/03/2014

Solanes, J.M.
Organization
Physis 2014
Facultat de Física, UB
16/06/14–20/06/14

Zanin, R.
Organization
Galactic MAGIC Meeting
Facultat de Física, UB
15/09/14–16/09/14

Arnab, K.; Faedo, A.
Organizing committee
Workshop: Holography and Strongly Coupled Plasma in the Veneziano Limit
10/11/14–14/11/14

At other institutions

Paredes, J.M.
Participation in organizer committee
Cosmic Ray Origin - beyond the standard models
Conference Centre of San Vito di Cadore
16/05/14–22/05/14

E. Epelbaum; Phillips, D.; Parreño, A.; Soto, J.
Organizing committee
Bound states and resonances in Effective Field Theories and Lattice QCD calculations
Centro de Ciencias de Benasque Pedro Pascual
20/07/14–01/08/14
Courses and Workshops

Masterclass on Particle Physics 2014

The Masterclass on Particle Physics, known in Catalonia as Taller de Física de Partícules, is an activity aimed at students from the second course of baccalaureate. It is part of the international program Hands on Particle Physics, organized by the International Particle Physics Group (IPPOG).

The workshop, which has been held at the University of Barcelona since 2005, lasts one day, during which students attend to several talks about particle physics and they have the opportunity of studying real data from the LHC. During the day there is also a presentation about the degrees offered by the UB at the Faculty of Physics and, additionally, it is possible to visit the laboratories.

This year 2014, two sessions for high school students have been held, on the 27th of March and on the 2nd of April, and 164 students from 94 Catalan high schools have attended. Additionally, a session for high school teachers has also been held on the 21st of March. This session was organized in collaboration with the Institut de Ciències de l’Educació of the UB and it included a workshop about teaching with inquiry techniques gaved by professors of the Psychology department of the UB.

Web: http://www.lhc.cat/taller.php

CiMs-CELLEX Program

The CiMs-Cellex is a scholarship program offered by the private foundation Cellex intended for giving to young students with strong motivation on the fields of mathematics and fundamental sciences the chance of coursing the two years of the International Baccalaureate in two Catalan institutes with well-known reputation for their high academic standards. The CiMs-Cellex program includes stays in some research centers, such as the ICCUB.

This year 2014 the ICCUB received 5 students within the framework of the two projects Introduction to Theoretical Physics: Quarks, Black holes, Cosmology and Strings (from the 18th of June to the 2nd of July) and Discovering Particle Physics (from the 23rd of June to the 2nd July).
Exhibitions

The ICCUB is responsible of four exhibitions which are printed by the institute and annually exposed at different external centres like, high schools, libraries or civic centres. Two of these exhibitions were fully produced by the ICCUB.

A thousand million eyes for a thousand million stars

Balaguer-Núñez, D.; Figueras, F.; Jordi, C.; Masana, E.; Olarte, B.

This is an itinerant exhibition about the Gaia mission consisting of 14 information boards which were edited and printed both in Catalan and Spanish in 2013.

http://serviastro.am.ub.edu/twiki/bin/view/ServiAstro/ExpoGaia

Itinerary 2014 of the Catalan version:

- University of Barcelona (Historic building)  
  1 to 5 December 2014
- In occasion of the International Congress The Milky Way Unravelled by Gaia.
- Sant Cugat Council  
  2 May to 12 June 2014
- Escola Mestral (Igualada)  
  1 to 13 May 2014
- University of Alacant  
  3 March to 29 April 2014
- Engineering schools of UPC (Terrassa campus)  
  17 February to 3 March 2014
  Relativity divulgation session.
- Escola Nostra Llar (Sabadell)  
  11 to 28 February 2014

Itinerary 2014 of the Spanish version:

- Universidad Complutense de Madrid  
  All along 2014
- School Compañía de María (A Coruña, Galicia)  
  10 to 30 November 2014,
- IES de Manuela Rial Mouzo Cee (A Coruña, Galicia)  
  14 to 21 May 2014
- IES Fernando Blanco de Cee (A Coruña, Galicia)  
  30 April to 13 May 2014
- IES de Beade (Vigo, Galicia)  
  7 to 11 April 2014
- Colexio Martín Códax (Vigo, Galicia)  
  31 March to 4 April 2014
- Colexio Rosalía Castro (Vigo, Galicia)  
  24 to 27 March
- Colexio Amor de Dios (Vigo, Galicia)  
  17 to 21 March 2014
- Science Faculty of the Vigo University (Vigo, Galicia)  
  7 to 14 March 2014

Amb A d’AstrònomA

Balaguer-Núñez, D.; Figueras, F.; Jordi, C.; Masana, E.; Olarte, B.

This is the Catalan version of the exhibition Con A de Astrònoma, dedicated to all woman astronomers from different eras and countries, whose contribution to Astronomy has been relevant in a worldwide scale.

http://serviastro.am.ub.edu/twiki/bin/view/ServiAstro/AmbA

Itinerary 2014:

- IES Menéndez y Pelayo (Barcelona)  
  19 November to 19 December 2014
- Centre penitenciari Ponent (Lleida)  
  11 February to 31 March 2014
- Associació Astronòmica de Sant Cugat–Valldoreix  
  December 2013 to January 2014
- Escola Joan Maragall (Sant Cugat)  
  27 to 30 January of 2014

The cosmic distances

Balaguer-Núñez, D.; Figueras, F.; Jordi, C.; Masana, E.; Olarte, B.

This exhibition, which was fully created by ICCUB members in 2012, shows the methods scientists use to calculate the distances to celestial objects, and how this methods have progressively evolved through the years depending on how far were the objects which were needed to be observed.

Nowadays, the ICCUB is responsible of the explanatory boards and manages the itinerary of the exhibition.

http://serviastro.am.ub.edu/twiki/bin/view/ServiAstro/DistanciesCosmiques

Itinerary in 2014:

- Escola Virolai (Barcelona)  
  12 to 24 November 2014.
Web Sites and social networks

ServAstro. http://servastro.am.ub.edu/

This is a web site maintained by the Astronomy and Meteorology Department of the UB. It offers information about past and future astronomical ephemerides, particularly those which are visible from Catalonia, and a compilation of tools for astronomical calculations, news, answers to frequently asked questions and links to lots of other websites about astronomy, organized in sections.

Descobrint la Física de Partícules amb l'LHCb, http://www.lhc.cat/

This a web site maintained by the Experimental Particle Physics Grup and int contains didactic material produced by the group and information about their outreach activities.

Cataquark: piulades de recerca i divulgació, https://twitter.com/cataquark

Twitter account maintained by ICCUB member J. Guasch devoted to particle physics news.

Gaia-UB in the social networks:
- https://www.facebook.com/gaiaub,
- https://twitter.com/GaiaUB
- https://www.youtube.com/channel/UCAdmF8h-oCllZZjMFxWPm5A

Facebook, Twitter and Youtube channel devoted to the divulagation of the Gaia Mission, particularly those activities in which ICCUB members participate.
Didactic Material

*Gaia cell phone App*

Android version for the Iphone app *Gaia Mission App* which was created in 2013. With this app you can explore the satellite in 3D, locate its components, experience the science behind Gaia or dive into the science and technology of the project.

Authors: Massana, E., in collaboration with FUSTA. S.L.

*Pamphlet about ICCUB itinerant exhibitions.*

It was designed and produced an informative pamphlet about the itinerant exhibitions organized by the ICCUB.

*GREAT Science from the Gaia Data Releases Banner*

It was designed a banner, to be hung at the Central building of University of Barcelona, during the meeting GREAT Science from the Gaia Data Releases.

Publications

**X. Luri**, *Si tu me dices Gen lo dejo todo*, 2014. Writing of two chapters.


The most precise measure of the Universe
9 January 2014
ICCUB Members: A. Cuesta, L. Verde

Spanish researchers discover the first black hole orbiting a 'spinning' star
16 January 2014
ICCUB Members: M. Ribó, J.M. Paredes

Gaia UB Group wins a 2013 Barcelona City Award
4 February 2014
ICCUB Members: Gaia Team

Special edition of the Particle Physics Workshop aimed at secondary education teachers
21 March 2014
ICCUB Members: A. Frutos, A. Moreno, H. Ruiz

The European Grid Infrastructure selects a software developed by ICCUB to give researchers access to computing resources
24 March 2014
ICCUB Members: R. Graciani

Dark energy hides behind phantom fields
25 March 2014
ICCUB Members: J. Solà
http://www.agenciasinc.es/en/News/

Joan Solà sull’energia oscura
28 March 2014
ICCUB Members: J. Solà
http://gallery.media.inaf.it/main.php/v/voci/interviste/20140327­joan­sola.mp3.html

Miraggi nel deserto quantistico
27 March 2014
ICCUB Members: J. Solà
http://www.media.inaf.it/2014/03/27/quantum-vacuum-energy/

The study of quasars reveals the most precise measurement of the expanding Universe
11 April 2014
ICCUB Members: J. Miralda

La UB se suma a la Big Data Week a Barcelona
6 May 2014
ICCUB Members: X. Luri, J. Portell, J. Torra
http://www.ub.edu/web/ub/es/menu_eines/noticies/2014/05/008.html

UB participates in the new Centre for Satellite Applications and Technologies created in Barcelona
18 June 2014
ICCUB Members: E. Salvador

Massive neutrinos and new standard cosmological model: No concordance yet
21 July 2014
ICCUB Members: L. Verde

La UB participa en el nou Centre d’Aplicacions Civils de Microsatèl·lits creat a Barcelona
1 September 2014
ICCUB Members: R. Guzmán, E. Salvador
http://www.ub.edu/web/ub/ca/menu_eines/noticies/2014/06/037.html

Gaia in your pocket: UB designs an app to track the progress of Gaia mission
10 September 2014
ICCUB Members: C. Jordi, M. Clotet

Gaia mission discovers its first supernova
12 September 2014
ICCUB Members: Gaia Team

Black hole gamma-ray lightning
10 November 2014
ICCUB Members: R. Zanin, J.M. Paredes, M. Ribó
The discovery that the expansion of the universe is accelerating receives another international award
12 November 2014
ICCUB Members: P. Ruiz-Lapuente

Gaia mission researchers meet at the UB
5 December 2014
ICCUB Members: Gaia Team

Researchers use real data rather than theory to measure the cosmos
15 December 2014
ICCUB Members: R. Jimenez, L. Verde

The Gaia mission: one year after the launch
18 December 2014
ICCUB Members: Gaia Team

Talks

J. Miralda, La Lluna i els seus misteris en la història de l'astronomia: de l'antiguitat fins a l'actualitat, Agrupació Astronòmica de Terrassa, Terrassa, 14/02/14

M. Romero, Descobrint la Galaxia amb Gaia, IES Joan Oró, Lleida, 19/02/14

C. Jordi, La missió espacial Gaia, "La nostra llar" School, Sabadell, 21/02/14

X. Luri, La matèria fosca i les seves alternatives, 4th Relativity divulgation days, Terrassa, 22/02/2014.

E. Masana, Què fan els astrònomes?, 1st and 3rd course primary students (two talks), Puiggracios School, La Garriga, 13/03/14

E. Graugés, L'antimatèria, Outreach course De què està fet l'Univers? CosmoCaixa, Tarragona, 18/03/14

J. González, J. Portell, Gestió de dades del projecte Gaia de l'Agència Espacial Europea, XXII Fòrum CIS (CosmoCaixa – BCN), 24/03/14

J. Portell, Cartografiant la Galaxia: el procés de dates de la missió Gaia, 8th Meeting of the SIG Lliure de Girona (statewide), 27/03/14

N. Garralda, Avances tecnológicos en materia aeroespacial llevados a cabo para construir este satélite: Misión Gaia, Inauguration talk for the exhibition Mil millones d'ulls per a mil milions d'estrelles, Universitat d'Alacant, Alacant, 03/04/14

M. Romero, Descobrint la Galaxia amb Gaia, Primary School "Pia Tàrrega", 25/04/14

M. Romero, L'Univers, estrelles i planetes, Primary School Escola Pia Tàrrega, 25/04/14

C. Jordi, Mil milions d'ulls per a mil milions d'estrelles, Inauguration talk, Ajuntament St. Cugat, 08/05/14

J.M. Carrasco, Gaia, Agrupació astronòmica de Barcelona (ASTER), 08/05/14

X. Luri, El mètode científic a la vida quotidiana, Centre Civic Golferichs, Barcelona, 15/05/2014

J.M. Paredes, Agujeros negros en el Universo, Inauguration talk for the XIII Jornadas de Divulgación de la Astronomía, Alacant University, Alacant, 16/05/14

X. Luri, Relatividad y cuántica para escépticos, EEEP, Barcelona, 17/05/2014

E. Masana, Què podem veure al cel?, 1st course students of the primary school Joan Coromines, Mataró, 22/05/14

J. Portell, Resultats inicials del satèl·lit Gaia: milions de mesures des d’un milió de quilòmetres, Agrupació Astronòmica d'Osona (Vic), 24/05/14

J.M., Carrasco, talk for the I curs de formació de monitors d'astronomia Starlight, Centre d'Observació de l'Univers (Àger), 26-27/05/2014

C. Jordi, Gaia mira mil milions d'estrelles amb mil milions d'ulls, Aules de la Gent Gran, Calella, 28/05/14

C. Jordi, Cometes: fascinació o misteri, Aules de la Gent Gran, UB, May 2014

C. Jordi, Cometes: fascinació o misteri, Aules de la Gent Gran, Sabadell, May 2014
C. Jordi, J. Portell, X. Luri, Big Data en astronomia: de l'antiga Grècia als nostres dies, Exhibition Big Bang Daf Big Data en astronomia ta, Centre de Cultura Contemporània, Barcelona, 10/06/14

J.M. Carrasco, Gaia, Espai cultural Galileu (Barcelona), 13/06/14

L. Garrido, L'accelerador de partícules LHC: un viatge cap al Big Bang, Physics School, University of Barcelona, 17/06/14

J.M. Carrasco, Gaia, 1st Meeting of the Astronomy Associations in Catalonia, (Igualada), 14/06/14

M. Ribó, L'espectre electromagnètic (l'Univers invisible), Starlight formation course, Centre d'observació de l'Univers (Àger), 17/06/14

N. Garralda, M. Palmer, Gaia, Col·legi Sacala Dei, 19/06/14

M. Ribó, Els forats negres... i altres objectes compactes, Physis- Summer workshop, Physics School, University of Barcelona, 19/06/14

J.M. Solanes, talk for the I curs de formació de monitors d'astronomia Starlight, Centre d'Observació de l'Univers (Àger), 16/06/14.

J.M. Solanes, talk for the Physis 2014, Facultat de Física, 16–26/06/2014

J. Portell, L'exploració de l'Espai: la revisitació d'una aventura clàssica, course El Festival de Sitges i el cinema fantàstic i de ciència ficció del segle XXI, at Els Juliols a la UB, 16/07/14

R. Empanan, Agujeros negros: espacio-tiempo al límite, Centre de Formació Interdisciplinària Superior, UPC, Barcelona, 01/10/2014

X. Luri, What does an astronomer do?, ESADE, Sant Cugat, 01/10/2014

J. Portell, Gestión de datos del proyecto Gaia de la Agencia Espacial Europea, Hotel NH Constanza, Barcelona, 08/10/14

M. Ribó, Els forats negres... i altres objectes, 1st Astronomy Festival at the Montsec, Centre d'Observació de l'Univers (Àger), 18/10/14

R. Empanan, Energía (two talks), "Setmana de la Ciència 2014", Primary School CEIP Collserola, Sant Cugat del Vallès, 04/11/14

M. Weiler, H. Voss, Conferència i retransmissió amb motiu de l'atterratge de la sonda Philae al cometa Churyumov–Gerasimenko, Physics School, University of Barcelona, 12/11/14

X. Luri, El método científico a la vida quotidiana, Biblioteca de Blanes, 18/11/2014

R. Empanan, Hasta el infinito, y más alla! De los agujeros negros a los confines del cosmos, "La Ciencia en primera persona – Dia de la Ciencia a les Escoles, Setmana de la Ciencia", CRP Vallés Occidental III. Rubí. 19/Nov/2014

E. Masana, Private Views IV, Tàpies Foundation, 22/11/14

J.M. Paredes, Forats negres, 3rd Astronomy Conference, Centre d’Estudis Casa de Cultura d’Ulldécona, Ulldecona, 22/11/14

C. Jordi, J. Portell, J. Torra, Gaia, l'Odissea Galàctica, congress The Milky Way Unravelled by Gaia, Historical Building, UB, 02/12/14

J. Portell, El camí dels bits cap a la Ciència: Milions de mesures d'un milió de quilòmetres, Historical Building, UB, 02/12/14

E. Antiche, J.M. Carrasco, L. Casamiquela, C. Jordi, M. Monguïo, M. Palmer, M. Romero, S. Roca, guided visits Mil milions d'ulls per a mil milions d'estrelles, International congress The Milky Way Unravelled by Gaia, Historical Building, UB, 02/12/14

Covering of astronomical events

Monitoring of the landing of the international mission Rosetta, 23/10/2014

It was prepared a website about the landing and it was covered the retransmission of the landing process, which took place at the School of Physics, University of Barcelona.
Participation in TV and radio shows

**J.M. Carrasco**, Interview about the mission Mars One at 8 al dia with Josep Cuní (8TV), 21/01/14, http://www.8tv.cat/8aldia/videos/2-catalans-preseleccionats-per-viatjar-al-planeta-mart/

**J.M. Carrasco**, Interview Gaia: el primer mapa 3D de la Galàxia at El problema de Gettier (Xarxa de Televisions Locals), 05/03/14 http://www.balaguer.tv/el-problema-de-gettier-gaia-el-primer-mapa-3d-de-la-galaxia/

**J.M. Carrasco**, Interview La Lluna i l’home, at Les notícies de les 10 (Barcelona TV), 15/04/14 http://www.btv.cat/alacarta/les-noticies-de-les/30579/

**X. Luri**, Interview about Gaia at El cafè de la República, Catalunya Ràdio, June of 2014.

**X. Luri**, Interview about the arrival of the man to the moon at the section Viaje por la historia, La Vanguardia, 2014.

**X. Luri**, Interview abot exoplanets at L’Illa Robinson, El punt TV, September of 2014.

**X. Luri**, Interview abot exoplanets at L’Illa Robinson, El punt TV, September of 2014.

Miscellaneous

**C. Jordi**, member of the jury of Adopta una estrella, investiga

**D. Balaguer; J.M. Carrasco; L. Casamiquela; C. Figueras; C. Jordi; E. Masana; R. Mor; S. Olarte; S. Roca; J. Torra**, Fira de la recerca en directe, Capella room, Historic building UB, 08-10/04/2014. Talk about the Gaia mission addressed to the students of several high schools.


**Equip Gaia**, participation in the Fira de la Recerca en Directe, Parc Científic de Barcelona, 08-10/04/2014

**J.M. Carrasco**, Interview about the hidden side of the moon, La Vanguardia Digital, 01/10/14

**J.M., Carrasco**, participation in Taller de coets, Escola Font d’en Fargas, 21/10/14

**X. Luri**, Collaboration in 4 articles, Diari ARA, 2014