



**Institut de Ciències del Cosmos**

**Memoria d'activitats 2008**

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# Projectes

## Astrofísica i Ciències de l'Espai

### Projectes del Pla Nacional d' I+D+I

**Títol:** Formation of Groups of Galaxies at LOw REDshift (FOGGALORE)  
**Referencia:** AYA2007-60366  
**IP:** José M. Solanes Majúa  
**Organisme** Dirección General de Investigación (MEC)  
**Durada:** 2007 - 2010  
**Quantitat:** 24.684,00 €

**Títol:** Medio Interestelar: procesos asociados en las primeras y últimas etapas de la evolución estelar  
**Referencia:** AYA2005-08523-C03-01  
**IP:** Robert Estalella Boadella  
**Organisme** MEC  
**Durada:** 2006 - 2008  
**Quantitat:** 115.000,00 €

**Títol:** Optimización del retorno científico de las imágenes astronómicas: deconvolución y superresolución mediante técnicas Bayesianas y Wavelets, aplicación a las cámaras Backe-Nunn y AL HST  
**Referencia:** AYA2005-08604  
**IP:** Jorge Núñez de Murga  
**Organisme** MEC  
**Durada:** 2006 - 2008  
**Quantitat:** 54.740,00 €

**Títol:** Procesos de ruptura de simetría especular y su relación con la emergencia abiótica de quiralidad  
**Referencia:** AYA2006-1648-C02-01  
**IP:** Josep M<sup>a</sup> Ribó Trujillo  
**Organisme** MEC  
**Durada:** 2007 - 2010  
**Quantitat:** 242.000,00 €

**Títol:** Estructura de los halos de materia oscura y formación y evolución de galaxias  
**Referencia:** AYA2006-15492-C03-03  
**IP:** Eduard Salvador Solé  
**Organisme** MEC  
**Durada:** 2006 - 2009  
**Quantitat:** 66.550,00 €

**Títol:** Parámetros fundamentales de las estrellas y caracterización de estructuras en el disco galáctico  
**Referencia:** AYA2006-15623-C02-02  
**IP:** Carne Jordi Nebot  
**Organisme:** MEC  
**Durada:** 2006 - 2009  
**Quantitat:** 60.500,00 €

**Títol:** Contribución al desarrollo científico y tecnológico de la misión GAIA  
**Referencia:** ESP2006-13855-C02-01  
**IP:** Jordi Torra Roca  
**Organisme:** MEC  
**Durada:** 2006 - 2009  
**Quantitat:** 406.550,00 €

**Títol:** Partículas energéticas solares: análisis de datos y modelos. SOLPENCO2  
**Referencia:** AYA2007-60724  
**IP:** Blai Sanahuja Parera  
**Organisme:** MEC  
**Durada:** 2007 - 2010  
**Quantitat:** 203.280,00 €

**Títol:** Estudio observacional y teórico de fuentes galácticas de alta energía desde radio hasta rayos-gamma muy energéticos  
**Referencia:** AYA2007-68034-C03-01  
**IP:** Josep M. Paredes Poy  
**Organisme:** MEC  
**Durada:** 2007 - 2010  
**Quantitat:** 149.435,00 €

### **Altres ajuts del Pla Nacional de I+D+I**

**Títol:** Supercomputación y eCiencia  
**Referencia:** CSD2007-00050  
**IP:** Mateo Valero Cortés (coordinador)  
**Organisme:** Ministerio de Educación y Ciencia (Consolider-Ingenio 2010)  
**Durada:** 2007 - 2011  
**Quantitat:** 5.000.000,00 €

**Títol:** La Gestión de los datos de GAIA: Desarrollo científico y tecnológico (III)  
**Referencia:** ESP06-26356-E  
**IP:** Jordi Torra Roca  
**Organisme:** MEC  
**Durada:** 2006 - 2008  
**Quantitat:** 406.550,00 €

**Títol:** La Gestión de los datos de GAIA: Desarrollo científico  
**Referencia:** ESP05-24356-E  
**IP:** Jordi Torra Roca  
**Organisme:** MEC  
**Durada:** 2006 - 2008  
**Quantitat:** 350.000,00 €

### **Ajuts autonòmics**

**Títol:** Participación en la propuesta de Estudio de Diseño del Cherenkov Telescope Array (CTA) para el 7º Programa Marco Europeo  
**Referencia:** ACO0771421  
**IP:** Manel Martinez Rodriguez  
**Organisme** Institut de Física d'Altes Energies  
**Durada:** 2007 - 2008  
**Quantitat:** 131.000,00 €

## Projectes Europeus

**Títol:** ELSA European Leadership in Space Astrometry  
**Referencia:** MRTN-CT-2006-033481  
**IP:** Lennart Lindegren (UB: Jordi Torra Roca)  
**Organisme** Unió Europea  
**Durada:** 2006 - 2010  
**Quantitat:** 190.497,00 €

**Títol:** Solar Energetic Particle Environment Modelling (SEPEM)  
**Referencia:** ESA 4769/05/NL/JD  
**IP:** Norma Crosby (BIRA; Brussels, Belgium), UB IP: Blai Sanahuja  
**Organisme** European Space Agency  
**Durada:** 2006 - 2009  
**Quantitat:** 400.000,00 €

## Física Nuclear, de Partícules i Gravitació

### Projectes del Pla Nacional d' I+D+I

**Títol:** Teoría y fenomenología de las interacciones fundamentales: Gravitación y cosmología  
**Referencia:** FPA2007-66665-C02-01  
**IP:** Jaume Garriga Torres  
**Organisme** MEC  
**Durada:** 2007 - 2010  
**Quantitat:** 325.000,00 €

**Títol:** Desarrollo de los centros españoles de segundo y tercer nivel (Tier-2 y Tier-3) para el procesado de datos del experimento LHCb  
**Referencia:** FPA2005-07761-C02-01  
**IP:** Ricardo Graciani  
**Organisme** MEC  
**Durada:** 2005 - 2008  
**Quantitat:**

**Títol:** Estudio de la violación de CP con el detector LHCb  
**Referencia:** FPA2005-06889-C02-1  
**IP:** Lluís Garrido Beltrán  
**Organisme** Ministerio de Educación y Ciencia  
**Durada:** 2005 - 2008  
**Quantitat:**

**Títol:** Teorías Cuánticas Efectivas y Fundamentales  
**Referencia:** FPA 2004-04582  
**IP:** Joaquim Gomis Torné  
**Organisme:** Ministerio de Educación y Ciencia  
**Durada:** 2004 - 2008  
**Quantitat:**

**Títol:** Descripción microscópica de estados exóticos de la materia  
**Referencia:** FIS2005-03142  
**IP:** Mario Centelles Aixala  
**Organisme:** MEC  
**Durada:** 2005 - 2008  
**Quantitat:**

**Títol:** Teoría y fenomenología de las interacciones fundamentales  
**Referencia:** FPA2007-66665-C02-01  
**IP:** Domènec Espriu Climent  
**Organisme:** MEC  
**Durada:** 2007 - 2010  
**Quantitat:**

**Títol:** Desarrollo de los centros españoles de segundo nivel (Tier-2) para el procesado de datos del experimento LHCb  
**Referencia:** FPA2007-66437-C02-01  
**IP:** Ricardo Graciani  
**Organisme:** MEC  
**Durada:** 2007 - 2010  
**Quantitat:**

**Títol:** Estudio de la violación de CP con el detector LHCb  
**Referencia:** FPA2008-06271-C02-01/FPA  
**IP:** Eugeni Graugés  
**Organisme:** MEC  
**Durada:** 2008 - 2011  
**Quantitat:** 776,00 €

**Títol:** Participación en el experimento BABAR del colisionador PeP-II de SLAC (EEUU). Estudios de violación de CP en mesones B y colisiones electrón-positrón a 19.6 GeV  
**Referencia:** FPA2005-05142  
**IP:** Fernando Martínez Vidal  
**Organisme:** CICYT - MEC  
**Durada:** 2005 - 2008  
**Quantitat:** 374,00 €

**Títol:** Desarrollo de nuevas tecnologías en aceleradores y detectores para los futuros colisionadores de Física de Partículas  
**Referencia:** FPA2008-05979-C04-02/FPA  
**IP:** Ángel Diéguez Barrientos  
**Organisme:** MEC  
**Durada:** 2008 - 2010  
**Quantitat:** 341.800,00 €

**Títol:** Quantum optics and information theory  
**Referencia:** -  
**IP:** J.I.Latorre  
**Organisme:** Ministerio de Educación y Ciencia  
**Durada:** 2006 - 2010  
**Quantitat:** 143.000,00 €

## Altres ajuts del Pla Nacional d' I+D+I

**Títol:** Centro Nacional de Física de Partículas, Astropartículas y Nuclear  
**Referencia:** CSD2007-00042  
**IP:** Lluís Garrido Beltrán  
**Organisme** CICYT, Programa Consolider-Ingenio 2010  
**Durada:** 2007 - 2012  
**Quantitat:** 10.000.000,00 €

**Títol:** Financiación del fondo común de LHCb  
**Referencia:** FPA2006-27293-E  
**IP:** Lluís Garrido Beltran  
**Organisme** MEC  
**Durada:** 2007 - 2008  
**Quantitat:**

**Títol:** Red temática de neutrinos RETENU  
**Referencia:** FPA2006-28443-E  
**IP:** María Concepción González-García  
**Organisme** MEC  
**Durada:** 2007 - 2008  
**Quantitat:**

**Títol:** Contribución española al M&O de LHCb para el año 2007  
**Referencia:** FPA2006-28446-E  
**IP:** Lluís Garrido Beltran  
**Organisme** MEC  
**Durada:** 2007 - 2008  
**Quantitat:**

**Títol:** Area de Física de Altas Energías - Participación en las reuniones del comité científico del SPSC del CERN  
**Referencia:** FPA2008-01710-E/FPA  
**IP:** Lluís Garrido  
**Organisme** MEC  
**Durada:** 2008 - 2010  
**Quantitat:** 6.000,00 €

## Altres ajuts nacionals

**Títol:** Phenomenology of Spontaneous Breaking of Fundamental Symmetries  
**Referencia:** INFN08-28  
**IP:** Domènec Espriu  
**Organisme** MEC  
**Durada:** 2008 - 2009  
**Quantitat:** 2.000,00 €

**Títol:** Symmetry Breaking Effects in Strong Interactions under Extreme Conditions  
**Referencia:** INFN08-27  
**IP:** Domènec Espriu Climent  
**Organisme** MEC  
**Durada:** 2008 - 2009  
**Quantitat:** 3.600,00 €

**Títol:** Effective theories of the strong interactions with applications to the physics of heavy quarkonium, quark-gluon plasma and collider production processes  
**Referència:** INFN08-32  
**IP:** Joan Soto  
**Organisme:** MEC  
**Durada:** 2008 - 2008  
**Quantitat:** 3.400,00 €

### Ajuts autonòmics-Grups de qualitat

**Títol:** Grup Consolidat de Recerca "Física Teòrica d'Altes Energies"  
**Referència:** 2005SRG00564  
**IP:** Joan Solà Perecaula  
**Organisme:** AGAUR, Generalitat de Catalunya  
**Durada:** 2005 - 2008  
**Quantitat:** 42.200,00 €

**Títol:** Grup Experimental de Física d'Altes Energies  
**Referència:** 2005SGR00385  
**IP:** Lluís Garrido Beltrán  
**Organisme:** AGAUR, Generalitat de Catalunya  
**Durada:** 2005 - 2008  
**Quantitat:** 41.200,00 €

**Títol:** Grup d'informació quàntica  
**Referència:** 2005SGR00523  
**IP:** J.I.Latorre  
**Organisme:** DURSI  
**Durada:** 2005 - 2008  
**Quantitat:** 42.200,00 €

### Projectes Europeus

**Títol:** MAESTRO (Methods and Advanced Equipment for Simulation and Treatment in Radioncology)  
**Referència:**  
**IP:** Francesc Salvat  
**Organisme:** Unió Europea  
**Durada:** 2004 - 2009  
**Quantitat:** 239.700,00 €

**Títol:** HELEN - High-Energy Latin-America Europe Network  
**Referència:** AML/19.0902/97/0666/II-0845-FC-FA-FCD-FI  
**IP:** Domènec Espriu  
**Organisme:** European Union (ALPFA Program)  
**Durada:** 2005 - 2009  
**Quantitat:** 24.750,00 €

**Títol:** Lattice and Effective Theory Approaches to Heavy Quark Physics  
**Referència:** HA2007-0025  
**IP:** Joan Soto  
**Organisme:** MEC  
**Durada:** 2008 - 2009  
**Quantitat:** 11.490,00 €



**Títol:** ACTINET, Network of Excellence for Actinide Sciences  
**Referència:**  
**IP:** Francesc Salvat  
**Organisme:** Unió Europea  
**Durada:** 2007 - 2008  
**Quantitat:** 2.000,00 €

**Títol:** Black holes in higher dimensional gravity theories  
**Referència:** MEIF-CT-2006-038924  
**IP:** Roberto Garcia De Salazar Alejand Emparan  
**Organisme:** Unió Europea  
**Durada:** 2005 - 2008  
**Quantitat:**

**Títol:** B decays and new effective field theories  
**Referència:** MOIF-CT-2006-021379  
**IP:** Joan Soto Riera  
**Organisme:** Unió Europea  
**Durada:** 2006 - 2009  
**Quantitat:** 317.851,00 €

**Títol:** Tools and Precision Calculations for Physics Discoveries at Colliders (HEPTOOLS)  
**Referència:** MRTN-CT-2006-035505  
**IP:** Costas Papadopoulos (UB: Joan Solà)  
**Organisme:** Unió Europea  
**Durada:** 2006 - 2009  
**Quantitat:**

**Títol:** EURIDICE  
**Referència:** HPRN-CT-2002-00311  
**IP:** Domènec Espriu Climent  
**Organisme:** Unió Europea  
**Durada:** 2006 - 2010  
**Quantitat:** 37.000,00 €

**Títol:** FLAVIANet: Entering the high precision era of flavour physics through the alliance of lattice simulations, effective field theories and experiments  
**Referència:** MRTN-CT-2006-035482  
**IP:** Antoni Pich, Santi Peris (en la UAB)  
**Organisme:** Unió Europea  
**Durada:** 2006 - 2010  
**Quantitat:** 81.224,00 €

**Títol:** Constituents, fundamental forces and symmetries of the universe  
**Referència:** MRTN-CT-2004-005104  
**IP:** Joaquin Gomis Torne  
**Organisme:** Unió Europea  
**Durada:** 2004 - 2008  
**Quantitat:** 8.617.762,00 €

**Títol:** ENRAGE - European Network on Random Geometries  
**Referència:** MRTN-CT-2004-005616  
**IP:** Domènec Espriu  
**Organisme:** European Union (6th Framework Program)  
**Durada:** 2004 - 2009  
**Quantitat:** 192.000,00 €

<b>Títol:</b>	Quantum Applications
<b>Referencia:</b>	
<b>IP:</b>	J.I.Latorre
<b>Organisme</b>	Unió Europea
<b>Durada:</b>	2005 - 2008
<b>Quantitat:</b>	80.000,00 €

# Publicacions

## Astrofísica i Ciències de l'Espai

### *Contribución al desarrollo científico y tecnológico de la misión GAIA* **ESP2006-13855-C02-01**

ICCUB-08-108: C. Jordi, C. Fabricius, J.M. Carrasco, F. Figueras, E. Masana, H. Voss, X. Luri, 'Stellar parameters through high precision parallaxes', Proceedings of the IAU Symposium 248 "A Giant Step: From Milli- to Micro-arcsecond Astrometry 248 (2008) , e-print archive: [http://www.am.ub.es/~carne/preprints/7210\\_Jordi.pdf](http://www.am.ub.es/~carne/preprints/7210_Jordi.pdf)

ICCUB-08-109: L. Lindegren, C. Babusiaux, C. Bailer-Jones, U. Bastian, A. Brown, M. Cropper, E. Hoeg, C. Jordi, D. Katz, F. van Leeuwen, X. Luri, F. Mignard, J. de Bruijne, T. Prusti , 'The Gaia mission: Science, organization and present status', Proceedings of the IAU Symposium 248 "A Giant Step: From Milli- to Micro-arcsecond Astrometry 248 (2008) , e-print archive:

### *Estudio observacional y teórico de fuentes galácticas de alta energía desde radio hasta*

#### *rayos-gamma muy energéticos* **AYA2007-68034-C03-01**

ICCUB-08-007: Albert, et al. (MAGIC Collaboration), 'MAGIC Observations of the Unidentified  $\gamma$ -Ray Source TeV J2032+4130', Astrophysical Journal Letters 675 (2008) , e-print archive: 0801.2391

ICCUB-08-008: Ribó, M.; Paredes, J. M.; Moldón, J.; Martí, J.; Massi, M., 'The changing milliarcsecond radio morphology of the gamma-ray binary LS 5039', Astronomy and Astrophysics 481 (2008) 17, e-print archive: 0801.2940

ICCUB-08-009: Albert, et al. (MAGIC Collaboration), 'Multi-wavelength (radio, X-ray and gamma-ray) observations of the gamma-ray binary LS I +61 303', Astrophysical Journal Letters (2008) , e-print archive:

ICCUB-08-010: Tagliaferri, et al. (MAGIC Collaboration), 'Simultaneous multiwavelength observations of the blazar 1ES1959+650 at a low TeV flux', Astrophysical Journal 679 (2008) 1029, e-print archive: 0801.4029

ICCUB-08-011: Paredes, J. M.; Martí, J.; Ishwara-Chandra, C. H.; Torres, D. F.; Romero, G. E.; Combi, J. A.; Bosch-Ramon, V.; Muñoz-Arjonilla, A. J.; Sánchez-Sutil, J. R., 'Radio detections towards unidentified variable EGRET sources', Astronomy and Astrophysics 482 (2008) 247, e-print archive: 0803.0721

ICCUB-08-012: Paredes, J. M., 'VHE Gamma-rays from Galactic X-ray Binary Systems', International Journal of Modern Physics D (2008) , e-print archive: 0803.1097

ICCUB-08-013: Paredes, J. M.; Martí, J.; Ishwara-Chandra, C. H.; Torres, D. F.; Romero, G. E.; Combi, J. A.; Bosch-Ramon, V.; Muñoz-Arjonilla, A. J.; Sánchez-Sutil, J. R., 'Radio detections towards unidentified variable EGRET sources', Astronomy and Astrophysics 482 (2008) 247, e-print archive: 0803.0721

ICCUB-08-015: Reynoso, Matias M.; Romero, Gustavo E.; Christiansen, Hugo R., 'Production of gamma rays and neutrinos in the dark jets of the microquasar SS433', Monthly Notices of the Royal Astronomical Society (2008) , e-print archive: 0801.2903

ICCUB-08-016: Eiroa, Ernesto F.; Romero, Gustavo E., 'Gravitational lensing of transient neutrino sources by black holes', Physics Letters B (2008) , e-print archive: 0802.4251

ICCUB-08-017: Masetti, N.; Mason, E.; Morelli, L.; Cellone, S. A.; McBride, V. A.; Palazzi, E.; Bassani, L.; Bazzano, A.; Bird, A. J.; Charles, P. A.; and 11 coauthors, 'Unveiling the nature of INTEGRAL objects through optical spectroscopy. VI. A multi-observatory identification campaign', *Astronomy and Astrophysics* 482 (2008) 113, e-print archive: 0802.0988

ICCUB-08-018: Romero, Gustavo E.; Vila, Gabriela S., 'The proton low-mass microquasar: high-energy emission', *Astronomy and Astrophysics* (2008) , e-print archive: 0804.4606

ICCUB-08-019: Bosch-Ramon, V.; Khangulyan, D.; Aharonian, F. A., 'Non-thermal emission from secondary pairs in close TeV binary systems', *Astronomy and Astrophysics* 482 (2008) 397, e-print archive: 0801.4547

ICCUB-08-020: Perucho, M.; Bosch-Ramon, V., 'On the interaction of microquasar jets with stellar winds', *Astronomy and Astrophysics* 482 (2008) 917, e-print archive: 0802.1134

ICCUB-08-021: Ribó, M., 'TeV Gamma-Ray Astrophysics', *Chin. J. Astron. Astrophys.* (2008) , e-print archive: 0801.2906

ICCUB-08-022: Negueruela, Ignacio; Torrejon, Jose Miguel; Reig, Pablo; Ribo, Marc; Smith, David M., 'Supergiant Fast X-ray Transients and Other Wind Accretors', proceedings of "A population explosion: the nature and evolution of X-ray binaries in diverse environments" (2008) , e-print archive: 0801.3863

ICCUB-08-023: Araudo, A. T.; Romero, G. E.; Bosch-Ramon, V.; Paredes, J. M., 'Gamma-ray emission from massive star forming regions', *International Journal of Modern Physics D* (2008) , e-print archive: 0805.1898

ICCUB-08-024: Bosch-Ramon, V.; Khangulyan, D.; Aharonian, F. A., 'On the X-ray/TeV connection in Galactic jet sources', *International Journal of Modern Physics D* (2008) , e-print archive: 0805.1700

ICCUB-08-025: Gabriela S. Vila, Gustavo E. Romero, 'Models for gamma-ray production in low-mass microquasars', *International Journal of Modern Physics D* (2008) , e-print archive: 0805.2085

ICCUB-08-032: Albert, et al. (MAGIC Collaboration), 'MAGIC observations of a 13-day flare complex in M87 in February 2008', *Astrophysical Journal Letters* (2008) , e-print archive: 0806.0988

ICCUB-08-101: Albert et al. (MAGIC Collaboration), 'Upper Limit for gamma-Ray Emission above 140 GeV from the Dwarf Spheroidal Galaxy Draco', *Astrophysical Journal* 679 (2008) 428, e-print archive: 2008ApJ...679..428A

ICCUB-08-112: Albert et al. (MAGIC Collaboration), 'Very-High-Energy Gamma Rays from a Distant Quasar: How Transparent Is the Universe?', *Science* 320 (2008) 1752, e-print archive: 0807.2822

ICCUB-08-118: Albert et al. (MAGIC Collaboration), 'Systematic Search for VHE Gamma-Ray Emission from X-Ray-bright High-Frequency BL Lac Objects', *Astrophysical Journal* 681 (2008) 944, e-print archive: -

ICCUB-08-121: Albert et al. (MAGIC Collaboration), 'Very High Energy Gamma-Ray Observations of Strong Flaring Activity in M87 in 2008 February', *Astrophysical Journal Letters* 685 (2008) 23, e-print archive: -

ICCUB-08-122: Aliu et al. (MAGIC Collaboration), 'First Bounds on the High-Energy Emission from Isolated Wolf-Rayet Binary Systems', *Astrophysical Journal Letters* 685 (2008) 71, e-print archive: -

ICCUB-08-123: Sánchez-Sutil, J. R.; Martí, J.; Combi, J. A.; Luque-Escamilla, P.; Muñoz-Arjonilla, A. J.; Paredes, J. M.; Pooley, G., 'Faint arc-minute extended radio emission around Cygnus X-3', *Astronomy & Astrophysics* 479 (2008) 523, e-print archive: 0801.1205

ICCUB-08-124: Albert et al. (MAGIC Collaboration), 'VHE  $\gamma$ -Ray Observation of the Crab Nebula and its Pulsar with the MAGIC Telescope', *Astrophysical Journal* 674 (2008) 1037, e-print archive: 0705.3244

ICCUB-08-125: Valenti Bosch-Ramon, Dmitry Khangulyan, 'Understanding the Very High-Energy Emission from Microquasars', *International Journal of Modern Physics D* (2008) , e-print archive: 0805.4123

ICCUB-08-126: V. Bosch-Ramon, D. Khangulyan, F. A. Aharonian, 'The magnetic field and the location of the TeV emitter in Cygnus X-1 and LS 5039', *Astronomy & Astrophysics* 489 (2008) 21, e-print archive: 0808.1540

ICCUB-08-127: Aliu et al. (MAGIC Collaboration), 'Observation of pulsed gamma-rays above 25 GeV from the Crab pulsar with MAGIC', *Science* 322 (2008) 1221, e-print archive: 0809.2998

ICCUB-08-149: Reig, P.; Torrejon, J. M; Negueruela, I.; Blay, P.; Ribo, M.; Wilms, J., 'Discovery of slow X-ray pulsations in the high-mass X-ray binary 4U 2206+54', *Astronomy & Astrophysics* (2008) , e-print archive:

ICCUB-09-179: Albert et al. (MAGIC Collaboration), 'Probing quantum gravity using photons from a flare of the active galactic nucleus Markarian 501 observed by the MAGIC telescope', Physics Letters B 668 (2008) 253, e-print archive: 0708.2889

***Formation of Groups of Galaxies at Low Redshift (FOGGALORE)***  
**AYA2007-60366**

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