

Marco Delbo *February 25, 1972*

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Scientific Interests

Origin and evolution of planetary systems. Study of the physical and dynamical properties of asteroids, comets and other small bodies; observations, modelling, and laboratory experiments on meteorites and other asteroid analogs. Space missions: ESA's Gaia (with responsibility of asteroid spectroscopy) and NASA's asteroid sample return OSIRIS-REx mission (with responsibility of asteroid thermal modeling). Spectroscopic, thermal infrared, and interferometric observations from the ground and from space. High spatial resolution observations: determination of asteroid shapes and presence of satellites. Astronomical instrumentation. Open source scientific codes. High performance computing.

Education

Université de Nice Sophia, Observatoire de la Côte d'Azur	NICE, FRANCE
Thèse d'Habilitation à Diriger des Recherches	2015
Thesis title: Studies of the physical nature of asteroids: current trends and perspectives. (committee: E. Lellouch, B. Marty, S. Raymond, O. Groussin, T. Guillot, P. Michel)	
DLR (German Aerospace Center), Free University of Berlin	BERLIN, GERMANY
PhD degree in Planetary Science	2004
Thesis title: The nature of Near Earth asteroids from the study of thermal infrared emission. (supervisor A. W. Harris)	
Physical, Natural and Mathematical Sciences, University of Genoa	GENOA, ITALY
Master Degree in Physics	1997
Thesis title: Automatic guiding system for the astrometric telescope of the Observatory of Turin. (supervisor M. Lattanzi)	

Skills

Technical expertise: Unix, Windows, Mac OS, C/C++, Python, Fortran, IDL, Assembly, Basic, Arduino.
Languages: Italian (*mother tongue*), English (*full professional proficiency*), French (*full professional proficiency*), German (*basic*), Spanish (*basic*).

Current Position

Laboratoire Lagrange, CNRS, Observatoire de la Côte d'Azur	NICE, FRANCE
CNRS CR1 (section 17) Research Scientist	Nov '12 – now
Permanent Position	

Previous Positions

Laboratoire Cassiopee, CNRS, Observatoire de la Côte d'Azur	NICE, FRANCE
CNRS CR2 (section 17) Research Scientist	Nov '08 – Nov '12
Permanent Position	
Laboratoire Cassiopee, Observatoire de la Côte d'Azur	NICE, FRANCE
Poincaré' Postdoctoral Fellowship	2008 & 2009
Position left in 11/08 for the CNRS permanent position	
Laboratoire Cassiopee, Observatoire de la Côte d'Azur	NICE, FRANCE
ESA external postdoctoral fellowship	2006 & 2007
INAF, Astronomical Observatory of Torino	TORINO, ITALY
Research Engineer	2002 – 2008
Permanent Position (2006 - 2008 detached at Observatoire de la Côte d'Azur)	
Deutsches Zentrum für Luft- und Raumfahrt, DLR	BERLIN, GERMANY
Ph.D. Student - 1/2 Position of Research Associate	2000 & 2001

INAF, Astronomical Observatory of Torino
Research Engineer and Data Analyst

TORINO, ITALY
 1998 & 1999

Awards

Asteroid (16250) was named after **Delbo** by the International Astronomical Union (IAU).
 ESA External Fellowship.
 Poincaré post-doctoral Fellowship

International and National Responsibilities

National Coordinator of the Minor Planet Physical Properties Catalogue (Virtual Observatory): <i>mp3c.oca.eu</i> that was approved as national service for the centres of treatment, archiving, and diffusion of data "Services d'Observations SO5" in Dec-2015	2014 – now
Member of the direction board of the research alliance Center for Planetary Origin – C4PO A training initiative at the doctoral and post-doctoral level from the IDEX – UCA JEDI	2016 – now
Referee for NASA's Research Opportunities in Space and Earth Sciences program.	2014

Telescope Time Allocation Committees:

Member of the board of referees of the TNG and Large Binocular Telescope (LBT)	2018
Member of the Scientific Council of the French Virtual Observatory.	2013 – 2014
Member of the science team of MATISSE, a second generation instrument for ESO VLTI	2012 – now
Member of the Observing Program Committee (OPC) of ESO.	2007 & 2010
Member of the time allocation committee for the Spitzer Space Telescope programs.	2006

Space Missions:

Member of the science team of the AIDA asteroid impact and deflection space mission.	2014 – 2017
Co-I of the OSIRIS-REX (NASA) sample return space mission.	2009 – now
Member of the DPAC Radiation Damage Task Force.	2008 – now
Responsible for the Gaia spectrophotometry of asteroids.	2007 – now
Member of the international consortium for the processing and analysis (DPAC) of Gaia data.	2006 – now

Referee for scientific journals and other publications:

Nature Astronomy • Icarus • Science • Astronomy & Astrophysics • Advances in Space Research •
 Planetary and Space Science • Astronomical Journal • Astrophysical Journal • Monthly Notices of the
 Royal Astronomical Society • Journal of Geophysical Research • Space Science Reviews • Asteroids IV (the
 fourth-edition of the decadal book of asteroid studies).

External Examiner of PhD Thesis:

Alexander Garenne. Institute of Astrophysics and Planetology of Grenoble. <i>Hydration and Carbonation on asteroids and Mars.</i>	2014
Anne-Sophie Maurin. Laboratoire d'Astrophysique de Bordeaux. <i>Characterisation of rocky exoplanets from their light-curve in the thermal infrared.</i>	2012
Benoit Carry. University 7 of Paris. <i>Study of the physical properties of asteroids with high angular resolution imaging.</i>	2009

Funded grant proposals and other projects

NASA – Sample Return Mission OSIRIS-REx. Geological interpretation of OSIRIS-REx thermal infrared measurements. Post-doc funding for two years. Grant of (234k USD) NASA - OSIRIS-REx	2019-2020
IDEX Jedi – Academies of Excellence of UCA. Uncovering the nature of celestial bodies with methods of material sciences. Advanced modelling of asteroid surfaces. Collaboration with CEMEF Mines-ParisTech Grant of (48 k) from the IDEX of the Université Cote d'Azur	2017

EU Horizon 2020 – NEOShield-2: Science and Technology for Near-Earth Object Impact Prevention Grant of (80 k) as CoI	2015 – 2018
PNP – Primitive asteroids and asteroid families. Identification of very old asteroid families (> 2-3 Ga) and search for the asteroids composed by the most primitive material in the Solar System Grant of (4.5k,4.5k,7k) from the National Program of Planetology (PNP)	2015 – 2017
ANR SHOCKS – Shocks in the Solar System: The importance of thermal processes and collisions for the formation of regolith on the surfaces of minor bodies and other small particles. Four-year grant (420k) from the French National Research Agency (ANR)	2011 – 2015
CNES – Support to the science activity related to the OSIRIS-REx Thermal Modeling and Study of the origin of the mission target asteroid (15k/year) from the French Space Agency (CNES). Coordinator P. Michel	2010 – 2015
PNP – Formation and evolution of regolith on asteroids by thermal cracking. An experimental approach. Grant of (5k) from the National Program of Planetology (PNP)	2011
BQR – Study of metamorphism of asteroids and meteorites by radiative overheating from close encounters with the Sun Three contracts (15k) <i>Bonus Qualité Recherche</i> (BQR Géoazur, University of Nice and OCA).	2010
ESA contract – Explore NEOs: Physical characterisation of 700 Earth-crossing asteroids using IR thermal observations from Spitzer. Contract (15k) with the European Space Agency for extraction of asteroid sizes and albedos.	2010
Helmholtz-Gemeinschaft Deutscher Forschungszentren Planetary Evolution and Life.	2008-2013
International Space Science Institute (ISSI) Bern Light Scattering Phenomena in Small Body Surfaces.	2008
Competitive time at major observing facilities PI and Co-I of more than 60 observational programs ESO VLT, VLTI, 3.6m, 2.2m; Keck; Spitzer; NASA-IRTF; TNG; Gemini.	2000-now

Organisation of Scientific Meetings and others activities (seminars)

Workshop on Minor Planet Databases – Nice, France.	September 2017
Astrometry and Astrophysics in the Gaia Sky. International Astronomical Union Symposium Nice, France.	April 2017
International Workshop: Primitive material in the Solar System II: The outer Solar System perspective Villefranche sur Mer, France	2016
2 nd International Conference on Thermal Models for Planetary Science (TherMoPS), Tenerife	2015
Convener of the Section Small Bodies, international European Planetary Science Congress, Nantes	2015
International Workshop: Carbonaceous chondrites: their parent bodies and their link with primitive asteroids, Villefranche sur Mer, France	2014
Co-convener of the Section Small Bodies, Asteroids and Near Earth Asteroids, international European Planetary Science Congress and Division of Planetary Sciences of the American Astronomical Society (EPSC-DPS), Nantes	2011
Co-convener of the Section Small Bodies and Planetary Moons – Comets, Asteroids and TNOs, International European Planetary Science Congress (EPSC), Rome	2010
Scientific Seminars of OCA	2009 – 2012
1 st International Conference on Thermal Models for Planetary Science (TherMoPS)	2008
Earth-Based Support to Gaia Solar System Science, Beaulieu	2008
Colloquium: Observations of minor bodies in the thermal infrared, Torino	2002

Membership of Scientific Societies and Consortia

Member of the American Astronomical Society (AAS) and the Division of Planetary Sciences	2006 – now
Member of the International Astronomical Union – IAU	2004 – now

Advisory and Direction of Research

Post-doc

<i>Andrew Ryan</i> – (UCA-JEDI/NASA) Thermal modelling of asteroids.	2018 – 2021
<i>Chrysa Avdellidou</i> – (UCA-JEDI) Massive Asteroid Data Bases.	2018 – 2020
<i>Josef Hanus</i> – (ANR/CNES) Thermal modelling of asteroids.	2013 – 2016
<i>Victor Ali-Lagoa</i> – (ANR/NEOSheild2) Thermal cracking of comets.	2014 – 2016
<i>Mathieu Niezgodá</i> – (ANR) Laboratory experiments of the thermal fracture of the meteorites.	2012 – 2013
<i>Naomi Murdoch</i> – (ANR) Analysis of the thermal fracture of meteorites.	2012
<i>Julie Gayon-Markt</i> – (CNES) Towards a new mineralogical map of the main asteroid belt.	2010 – 2012
<i>Michael Mueller</i> – (Poincaré) Determination of the size distribution of main belt (up to km-size) and Near Earth asteroids.	2009 – 2011

PhD

<i>Diego Uribe</i> Co-Supervision – Thesis: Modeling Fracture: From metallic alloys to comets.	2018 – 2020
<i>Bryce Bolin</i> – Thesis: Identification of asteroid families older than 2 billions of years.	2014 – 2018
<i>Chrysa Avdellidou</i> (Co-supervisor with Kent, UK) – Thesis: Hypervelocity impacts in the Solar System: An experimental investigation on the fate of the impactor.	2014 – 2016
<i>Victor Ali-Lagoa</i> (Co-supervisor with IAC, Spain) – Thesis: Determination of the physical properties of asteroids from the WISE data in the thermal IR.	2009 – 2010
<i>Alexis Matter</i> (Co-supervisor at OCA) – Thesis: Determination of the physical properties of asteroids from interferometric observations in the thermal IR.	2009 – 2010

Stages

<i>Tristan Dequaire</i> – Test of the algorithm for the classification of asteroid spectra from Gaia.	2013
<i>Clara Maurel</i> – Study of the fracturing of meteorite.	2013
<i>Emilie Marchese</i> (Co-Tutor) – Software development: Shape model determination of asteroids, application in C language.	2010
<i>Mathieu Havel</i> (Co-Tutor) – Study of the fissility of the the measure of the Yarkovsky Effect for Earth-crossing asteroids with Gaia.	2007
<i>Valeire Seymour</i> (Tutor of exchange student) – Asteroid Photometry	2001
<i>Martin Prescher</i> (Co-Tutor) – Determination of the physical properties of Small Bodies in our Solar System.	2001

Teaching Activities and Public Engagement

Postgraduate Schools for Astrophysics

International School for optical interferometry
Infrared interferometry of solar system minor bodies
PORQUEROLLES, FRANCE
2010

School for Astronomy
Astronomy in Dante's Divine Comedy.
PORQUEROLLES, FRANCE
2009

International School for Dynamics of Gravitational Systems: challenges and perspectives.
Yarkovsky and YORP effects : the link between the dynamics and the physical properties of small bodies
AUSOIS, FRANCE
2009

International School of Space Chemistry, 6th Course/Workshop
The Physical Properties of Potential Earth Impactors : Know your Enemy
ERICE-SICILY, ITALY
2001

University

Cycle of Lectures, Centre de Recherches Pétrographiques et Géo-chimiques
Space missions to asteroids
NANCY, FRANCE
2014-2016

Cycle of Lectures, Charles University PRAGUE, CZECH REPUBLIC
Asteroid physical properties
2011

Cycle of Lectures, University of Nice Sophia Antipolis
Asteroid dynamic properties NICE, FRANCE
 2010

Teaching Assistant, University of Nice Sophia Antipolis
Laboratory of experimental physics (Electromagnetism) NICE, FRANCE
 2007

Schools

Coordinator of teaching programs, University of Genova
Laboratory of Astronomy – Science Exhibition ‘Imparagiocando 3’ (learn by playing) GENOVA, ITALY
 1996 – 1999

**Laboratory of Astronomy – Astronomy for students and teachers
 (primary and high schools)** 1996 – 1999

Co-author of a didactic guide for teaching Astronomy in the primary and high schools. 1996 – 1999

Coordinator of teaching programs, University of California – Berkeley
‘How to teach Astronomy in the primary and the high schools’ (with Prof. C. Sneider) 1996

Visitor

Leiden Observatory, The Netherlands, Visiting Scientist. 2017
 European Space Agency ESTEC, The Netherlands, Visiting Scientist. 2016-2017
 University of Manoa, Hawaii, USA. Visiting Scientist. 2012 & 2015 & 2017
 Infrared Telescope Facility (IRTF), Hawaii, USA. Visiting astronomer. 2013,2017
 SouthWest Research Institute, Boulder (CO), USA. Visiting Scientist. 2011 – 2013
 Astronomical Institute of the Charles University, Prague, CZ. Invited visiting Professor. 2011
 European Southern Observatory, Garching, Allemagne 2011
 Jet Propulsion Laboratory, Pasadena (CA), USA. Visiting Scientist. 2010
 European Southern Observatory, Paranal. Visiting astronomer. 2006 – 2010
 German Aerospace Center (Deutsches Zentrum fur Luft- und Raumfahrt - DLR), Berlin, Germany. 2002 – 2004
 European Southern Observatory, La Silla. Visiting astronomer. 2001 – 2004
 Institute for Radioastronomy, Bologna, Italy 2001
 Keck Observatory, Waimea, Hawaii, USA. Visiting astronomer. 2000 – 2002
 Institute of Astronomy, Hilo, Hawaii, USA. Visiting astronomer. 2000 – 2001

Major Collaborations

1. *K.T.Ramesh* and *J.Wilkinson*, Thermomechanical modeling and experiments of asteroids and meteorites thermal breakdown, Johns Hopkins University, Baltimore, US
2. *K.Walsh* and *W.Bottke*, Origins of asteroids and asteroid families, Southwest Research Institute, Boulder, CO, US
3. *M.C.Price* and *Ch.Avdellidou*, Survival of the impactor during hypervelocity collisions, Centre for Astrophysics and Planetary Science, University of Kent, Canterbury, UK
4. *D.Hestroffer* and *W.Thuillot*, Asteroid physical properties, IMCCE and LESIA, Paris Observatory, France
5. *J.Durech*, Shape modeling of asteroids, Charles University of Prague, Czech Republic
6. *A.Cellino*, Polarimetry and Spectroscopy of asteroids, INAF Torino Observatory, Italy
7. *D.Lauretta*, Sample return mission Osiris-Rex, University of Arizona, AZ, US
8. *J.Emery* and *B.Rozitis*, Thermal modeling of asteroids, University of Tennessee, Tennessee, US