MARCO BERSANELLI

CURRICULUM VITAE – SHORT VERSION

(Update: 03/2018)

Birth: 29th January 1960 at Milano, Italy.

Nationality: Italian.

Family: Married to Antonella (1962). Children: Matteo (1987); Ilaria (1988); Sofia (1993).

Current position

Full Professor of Astronomy and Astrophysics
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Research profile

Professor Marco Bersanelli (M.B.) works in the field of observational cosmology, particularly on measurements of the Cosmic Microwave Background (CMB), the relic radiation from the early universe. In the past 25 years played a leading role in the ESA Planck space mission, launched in 2009, dedicated to high-precision, high-resolution, full-sky measurements of the CMB in temperature and polarization. He is Instrument Scientist and Deputy-PI of Planck-LFI – one of the two instruments on-board the satellite – and a member of the Planck Science Team. Since the beginning of the project (1992), M.B. contributed to the definition of the mission scientific goals, satellite configuration, orbit and scanning strategy. As Instrument Scientist he led the design, development, testing and calibration of the LFI (an array of cryogenic coherent HEMT-based radiometers in the 30-70 GHz range) and contributed to the Planck data analysis. The Planck results released in 2013 and 2015 provided a spectacular confirmation of the ΛCDM cosmological model with unprecedented estimates of the key cosmological parameters, including new limits on inflation scenarios. The Planck maps also have a huge impact on Galactic and extragalactic astrophysics, including the first full-sky survey of galaxy clusters via SZ effect, the discovery of thousands of new point sources, new studies of star formation and Galactic magnetic fields from synchrotron and interstellar dust emission. In his contribution to Planck, M.B. has co-authored over 140 refereed papers with more than 27,000 citations.

Before the onset of Planck, M.B. worked at LBNL, Berkeley, in the group of G.F. Smoot, Nobel Prize for Physics in 2006. In the period 1986-1993, M.B. carried out at a series of ground-based observations to measure the frequency spectrum of the CMB in the range 1.5-90 GHz. He participated in three field campaigns at the White Mountain High Altitude Station, University of California, and in two campaigns at the Amundsen-Scott Station at the South Pole. These efforts produced new limits to CMB spectral distortions at low frequencies before the COBE/FIRAS data became available. He also used the South Pole and White Mountain data to study the diffuse synchrotron and free-free emission from the Milky Way and the microwave properties of the Earth's atmosphere. Furthermore, in the 1990's, M.B. participated in new studies of the Optical and Near-IR properties of Active Galactic Nuclei (AGNs), in particular BL-Lac objects, based on observations at ESO, La Silla, Chile.

M.B. promoted several mm-wave technology development projects involving Industry, Research Institutes and Universities. In the early 2000's he founded the microwave laboratory at Physics Department, University of Milano, devoted to precision free-space characterization of microwave subsystems, as well as to training of students and young researchers.

Currently M.B. is involved in new efforts to search for potential inflation signatures ("B-modes") in the CMB polarization pattern, in coordination with other European partners and with the support of ASI (COMSOS project). He is PI of STRIP, as part of the ASI/INFN experiment LSPE combining ground-based and balloon-borne measurements, and team *Architect* in the QUBIC Collaboration. He has contributed to CMB post-Planck ESA mission studies (COrE, PRISM, COrEplus) and he is now involved in the JAXA LiteBIRD space project.

Career

1986: Graduation in Physics, University of Milano;
1986-90: Visiting Scholar at Lawrence Berkeley National Laboratory, University of California, Berkeley;
1988-99: Staff Researcher at *Istituto di Fisica Cosmica e Tecnologie Relative (IFCTR),* CNR, Milano;
1999-00: Senior Researcher at *IFCTR*, CNR, Milano;
1990-95: Visiting Researcher at Lawrence Berkeley National Laboratory;
2000-06: Associate Professor of Experimental Physics, Physics Department, University of Milano;
2006-present: Full Professor of Astronomy and Astrophysics, Physics Department, University of Milano.

Scientific responsibilities

1993-94: Assessment Study of COBRAS/SAMBA mission (ESA);
1994-96: Phase A Study of COBRAS/SAMBA mission (ESA);
1996-present: Science Team of the Planck mission (ESA), Instrument Scientist of Planck-LFI;
2010-present: Deputy PI of Planck-LFI;
2005-07: Science Committee of *Istituto Nazionale di Astrofisica* (INAF);
2003-2013: Vice-President of *Consorzio Inter-Universitario di Fisica Spaziale* (CIFS);
2003-present: Science Director of *Euresis* (Association for the Promotion of Scientific Culture);
2005-present: *Piero Caldirola International Center for the Promotion of Science and International School of Plasma Physics*;
2010-2011: Search Committee for the Directorate of the *National Agency for the Evaluation of Universities and Research Institutes* (ANVUR);
2009-present: Science Committee of *Camplus*, Excellence University Colleges Network;
2009-2015: Director of the *PhD School in Physics, Astrophysics and Applied Physics*, University of Milano;
2011-2014: Member of the National Scientific Committee for Research in Antarctica (CSNA);
2011-2015: Scientific Advisor of the Italian Delegation at the Science Program Committee (SPC) of ESA;
2012-present: Co-PI of LSPE and PI of the LSPE/STRIP instrument;
2016-present: *Architect* in the QUBIC Collaboration;
2017-present: *Calibration JSG Convener* and *External Collaborator* in the JAXA LiteBIRD space project.

M.B. participated in a number of project evaluation committees (for ASI, NASA, ERC, *Agence Nationale de la Recherche*, Irish Government, Spanish Government). In Italy, he regularly takes part in National academic committees for hiring University Professors and Research staff, and for evaluating proposals for National Grants (PRIN, SIR, FIRB). In 2010 he was nominated by the Italian Ministry in the ANVUR Search Committee.

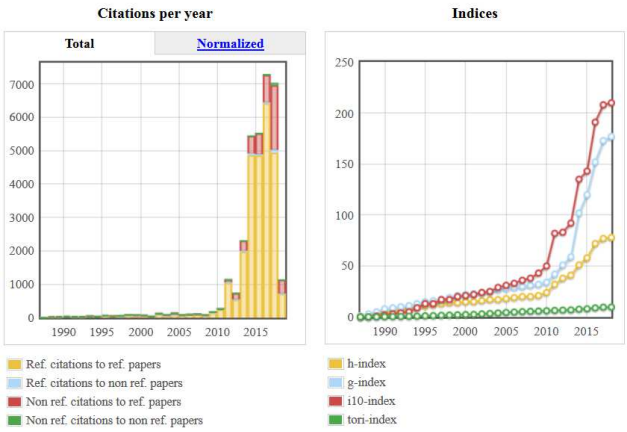
As Director of the PhD School in Physics at Milano University, in the period 2009-2015, M.B. has managed a PhD program for 125 PhD students and led a Graduate Faculty Committee of about 65 professors covering all areas of Physics, including Astrophysics and Cosmology, Particle and Nuclear Physics, Matter Physics, Theoretical Physics, Applied Physics.

M.B. has been PI or co-PI of a number of science and technology grants. Italian ministerial (MIUR) grants included: PRIN (2006-2008), 150k€; PRIN (2009-2012), 269k€. ASI and INFN funded projects (besides Planck-LFI) included: mm-Wave Technology Development (2010-2014), 3M€; LSPE/STRIP (2012-2016), 1.5M€. Regional Council (Sardinia and Lombardy) funded program on Microwave Technology Development (2012-2016), total budget: 3.2 M€.

Publications and talks

M.B. is author of about 350 papers, more than 250 of which are published in main Refereed Journals in the field of Astrophysics and Cosmology (*Astronomy & Astrophysics*, *The Astrophysical Journal*, *The Astronomical Journal*, JCAP, *Monthly Notices of the Royal Astron. Soc.*, *Astrophysical Letters & Comm.*) and Experimental Refereed Journals (*IEEE*, *Experimental Astronomy*, *JINST*). H-index: 78; Citations: over 32,000 (for details see plots below – *Source: NASA/ADS*). M.B. is author of many *Conference Proceedings* and *Technical Notes*, some of

which were key for the development of hardware for the Planck mission. M.B. has been referee for several International Journals. Since 2013 he is part of the Editorial Board of Journal of Instrumentation (JINST).



In the past 10 years M.B. gave over 35 invited talks and lectures, mostly presenting Planck results, in several Universities and Research Centres, including: Heidelberg University (30 May 2008), Copenhagen Niels Bohr Institute (3 June 2008, 9 June 2009), ESA/ESTEC (27 October 2008, 4 April 2013), Varenna/IDAPP (17 June 2009), Barcelona University (10 September 2010), Pars/IAP (10 January 2011, 25 June 2012), Padua/INFN (18 May 2011), Chicago, Fermilab (7 March 2012), South Dakota/PPC2013 (12 July 2013), Como/ICATPP (23 September 2013), Pavia University (25 September 2014, 23 June 2016), Ferrara University (1 December 2014), University of Milano-Bicocca (12 December 2014), Princeton University (June 2015), Rome La Sapienza/MGXIV (July 2015), Milano Politecnico (11 April 2016), Turin Observatory (27 April 2016), CERN, Geneva (18 May 2016), James Madison University (1 November 2016).

Honors

NATO Advanced Grant, 1990;
NSF Medal for Research in Antarctica, 1991;
FEST (*Fiera Internazionale Editoria Scientifica*), 1st ranking, Trieste, 2007;
ASI Award for contribution to Planck, 2010;
ESA Award for achievements in Planck (*to Planck Collaboration*), 2010;
Istituto Lombardo Accademia di Scienze e Lettere, 2012;
NERSC Award for High Impact Scientific Achievement (*to Planck Collaboration*), 2014;
Group Achievement Award from the Royal Astronomical Society (*to Planck Collaboration*), 2018.

Teaching and Research Training

1986-87, University of California, Berkeley: *Teaching Assistant*, Course 7C (Physics for Engineers);
1996-99, S.I.S.S.A., Trieste: *Observational tests in Cosmology,* graduate course;
1999-01, University of Milano: *Physics for Computer Science*; Laurea in Computer science;
2000-06, University of Milano: *Laboratory of Space Instrumentation*, Laurea Magistrale in Physics;
2003-05, University of Milano: *Introduction to Astrophysics*, Laurea Triennale in Physics;
2004-06, University of Milano: *Cosmologia*, Laurea Magistrale in Physics;
2006-present, University of Milano: *Astronomy (Part I and Part II),* Laurea Magistrale in Physics;
2009-present, University of Milano: *Physics 1 (Mechanics)* Laurea Triennale in Physics.

M.B. has been Supervisor/Referee of 15 PhD students (eight in Italy, and one each from *Doctorat Astronomie et Astrophysique, Ecole Doctorale d'Astronomie et d'Astrophysique d'Ile-de-France, Observatoire de Paris*, *Open University*, *Danish Space Researh Institute of Copenhagen, Manchester University*) and Supervisor of more than 50 Thesis of *Laurea Magistrale* (Master Degree) and several Thesis of *Laurea Triennale* at University of Milano. Over his career at Physics Department at Milano University, he has built a research group of about 12 people, most of whom where M.B.'s former students. The group is active in observational cosmology, radio

and mm-wave astrophysics, microwave technology development. His group currently includes two Associate Professors (prof. Davide Maino, prof. Aniello Mennella), one Staff Researcher (dr. Maurizio Tomasi), five Research Associates, one Technician, three PhD Students. A number of former students of M.B.'s are continuing their career in high level astrophysics groups in Europe and USA.

Outreach & Education

M.B. regularly gives public outreach and interdisciplinary conferences (on average 8-10 per year in the past 10 years) on science and cosmology, in Italy and abroad. A few recent examples include: Krakow, October 2017, *On the observability of the Early Universe;* Amsterdam, October 2013, World Science Festival, *Our Universe Exposed: Planck's Perfect Echo of the Past*; Bologna, 27 September 2013, *Origins;* Milano, 10 April 2013, *Missione Planck. L'universo come non lo avete mai visto,* with Malcom Longair; Krakow, May 2014, *Exploring the limits of space-time*; DePaul University, Chicago, 7 March 2012, *At the Origin of the Universe*.

From 2007 to 2015 M.B. has promoted a series of yearly academic interdisciplinary symposia on frontier topics in science, held in the Summer at the University of San Marino (the "*San Marino Symposia"*), involving world-class scientists and scholars (http://www.euresis.org/symposia/). These were also connected to large-scale popular lectures at the Rimini Meeting, attended by several thousand people.

M.B. has published essays, books and book chapters cosmology, astronomy, science education, and exploring the links between science and humanities (including *From Galileo to Gell-Mann,* Templeton Press, 2009; *Infinity and the Nostalgia of the Stars*, in «Infinity. New Research Frontiers», Cambridge University Press, 2011; *Light in the Beginning*, in «Light from light», Eerdmans, 2011; *Il grande spettacolo del cielo*, Sperling & Kupfer 2016). He wrote articles for some of the leading newspapers in Italy, participated in TV and radio interviews and press releases.

He co-authored a dozen of scientific exhibitions, visited by tens of thousands of people in Italy, some of which were translated into English, Spanish, German, Arabic. Since 2009 M.B. is Scientific Director of *Euresis* a free scientific association. Since 2012 he is President of *Sacro Cuore* Foundation for the Education of the Young People, managing a set of schools in Milano ranging from high school to kindergarten.