FRANCESCO PIACENTINI Curriculum Vitae – May 23, 2017

Nome e cognome	FRANCESCO PIACENTINI
Data e luogo di nascita	26/10/1971, CREMONA (CR)
E-mail / telefono	francesco.piacentini@uniroma1.it / 0649914358
Posizione	Prof. Associato, settore concorsuale FIS/05, Sapienza Università di Roma
E-mail	francesco.piacentini@uniroma1.it
Current Position	Associate Professor, Astronomy and Astrophysics

Part II – Education

Туре	Year	Institution	Notes (Degree, Experience,)
University graduation	1998	University of Rome La Sapienza	Physics, 110/110
PhD	2004	University of Rome La Sapienza	Astronomy
Licensure 01	2001	Ministero della Pubblica Istruzione	Abilitazione all'insegnamento nella scuola secondaria superiore, classe Matematica e Fisica
Qualification	2013	Ministero della Pubblica Istruzione	National scientific qualification, 02/C1 (abilitazione scientifica nazionale)
Qualification	2014	Ministero della Pubblica Istruzione	National scientific qualification, 02/C1 (abilitazione scientifica nazionale)

Part III – Appointments and other activities

III/A – Academic Appointments

Start	End	Institution	Position
2015	Now	University of Rome La Sapienza	Associate Professor (since Sept 01 2015)
2008	2015	University of Rome La Sapienza	Researcher (Jul 01 2008, Aug 31 2015)
2004	2006	University of Rome La Sapienza	Post-Doc fellowship
2000	2003	University of Rome La Sapienza	PhD fellowship
1999	2000	University of Rome La Sapienza	Research contract

III/B – Other Appointments

Start	End	Institution	Position
2006	2008	European Space Agency – European	Space Scientist, full time, with permanent position at Rhea
		Astronomy Center, Science Division	system S.A.

		Villafranca del Castillo, Madrid, Spain	
2001	2006	Provveditorato agli studi di Roma	Teacher in Italian Public School, in standby for research activity (docente titolare di Matematica e Fisica presso Liceo Scientifico, in congedo per motivi di ricerca)
2002/10	2003/02	Programma nazionale di ricerche in Antartide	Participant
1998/10	1998/12	Unites States Antarctic Program	Participant
1998/02	1998/10	Presidenza del Consiglio dei Ministri, Servizi Tecnici Nazionali	Italian Civil Service

III/C – Other Activities

Start	End	Institution	Position
2001	Now	'The Astrophysical Journal', 'Journal of Cosmology and Astroparticle Physics (JCAP)', 'Journal of Instrumentation (JINST)', 'International Journal of Modern Physics D', 'Journal of Low Temperature Physics'	Referee
2012	2013	Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca	VQR reviewer (2004-2010 period)
2006/06	2006/08	Institut d'Astrophysique Spatiale, Universiy Paris-Sud, France	Planck HFI calibration campaign
1997/05	1997/08	NASA-NSBF, Palestine Texas, USA	BOOMERanG Experiment balloon flight campaign

Part IV – Teaching experience and other Academic duties

IV/A – Teaching Experience

Year	Institution	Lecture/Course
2016/17	University of Rome La Sapienza	Fisica / LT in Scienze Biologiche
2016/17	University of Rome La Sapienza	Processi e Plasmi Astrofisici / LM in Astronomia e Astrofisica
2015/16	University of Rome La Sapienza	Fisica / LT in Scienze Biologiche
2015/16	University of Rome La Sapienza	Processi e Plasmi Astrofisici / LM in Astronomia e Astrofisica
2014/15	University of Rome La Sapienza	Processi e Plasmi Astrofisici / LM in Astronomia e Astrofisica
2014/15	University of Rome La Sapienza	Elettromagnetismo (esercitazioni) / Fisica
2013/14	University of Rome La Sapienza	Elettromagnetismo (esercitazioni) / Fisica
2013/14	University of Rome La Sapienza	Processi e Plasmi Astrofisici / LM in Astronomia e Astrofisica
2012/13	University of Rome La Sapienza	Elettromagnetismo (esercitazioni) / Fisica
2012/13	University of Rome La Sapienza	Processi e Plasmi Astrofisici / LM in Astronomia e Astrofisica
2011/12	University of Rome La Sapienza	Processi e Plasmi Astrofisici / LM in Astronomia e Astrofisica

2010/11	University of Rome La Sapienza	Processi e Plasmi Astrofisici / LM in Astronomia e Astrofisica
2009/10	University of Rome La Sapienza	Elettromagnetismo (esercitazioni) / Fisica
2009/10	University of Rome La Sapienza	Processi e Plasmi Astrofisici / LM in Astronomia e Astrofisica
2008/09	University of Rome La Sapienza	Meccanica (esercitazioni) / Chimica
2001-2006	University of Rome La Sapienza	Esercitazioni in numerosi corsi (Fisica per Farmacia, Fisica per CTF, laboratorio di termodinamica, Meccanica per Matematica)

IV/B – Other Academic duties

Year	Institution	Activity
Since 2015	University of Rome La Sapienza	Responsabile percorsi di eccellenza
2010	University of Rome La Sapienza	Curatore scientifico della guida della Biblioteca
Since 2009	University of Rome La Sapienza	Commissione didattica per la ammissione di studenti provenienti da altri corsi di laurea
Since 2009	University of Rome La Sapienza	Consulente scientifico Biblioteca – Library Scientific consultant
2008-2011	University of Rome La Sapienza	Membro del Collegio Docenti del dottorato in Astronomia
Since 2008	University of Rome La Sapienza	Relatore di oltre 30 tra tesi di laurea triennale, specialistica e magistrale

Part V - Society memberships, Awards and Honours

Year	Title
2004	Premio di ricerca Felice Ippolito per le scienze fisiche / Research Award Felice Ippolito for Physical Sciences
2000	Antarctica Service Medal of the United States of America / National Science Foundation (USA)

Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

Year F	Role	Code/Title	Program	Grant value
2016	PI	PNRA14_00027	Programma Nazionale Ricerche in Antartide	120000,00 €
2015	ΡI	C26A15KXB4 - Cosmology and dark matter search: observation, instrumentation and data analysis	Ricerche Universitarie	10000,00 €
2014	PI	C26A14FP3T	Ricerche UNIVERSITARIE	8000,00 €
2014/15	Ι	AO/1-7393/12/ML/NH	European Space Agency ITT	
2013	Ι	C26A1324B9 - Unimap - Software di produzione immagini per il satellite	Ricerche UNIVERSITARIE	6500,00 €

		Herschel		
2012/13	Ι	ITT AO/1-7136/12/ML/NH	European Space Agency ITT	
2012	PI	Astrophysics and cosmology in the microwave band: analysis and simulations	HPC Grant (CASPUR)	100000 cpu hours
2012	PI	C26A12PC4R - Data analysis, observation and instrumentation for astrophysical experiments in the microwave band	Ricerche UNIVERSITARIE	6000,00€
2011	Ι	C26G11R4E3 - Scheda di sviluppo di elettronica digitale basata su FPGA per rivelatori di radiazione millimetrica e sub- millimetrica per cosmologia osservativa	Grandi attrezzature	
2011	PI	C26A11JPNS - Instrument optimization for observational cosmology experiments	Ricerche UNIVERSITARIE	11000,00€
2010	PI	C26A10AB9R - Analysis and measurements of systematic effects and optimization of observational cosmology experiments in microwave band	Ricerche UNIVERSITARIE	15000,00€
2009	Ι	2009WSZEXF_001/P. de Bernardis: Spettroscopia millimetrica e submillimetrica per studi ad alta risoluzione di galassie primordiali e ammassi di galassie	PRIN	
2008	PI	C26F08Z5KE	Ateneo Federato (La Sapienza)	
2008	Ι	Herschel Open Time Key Project - Hi- GAL	Italian Space Agency	87203,18€
2008	Ι	SAGACE: studio di fase A per missione spaziale	Italian Space Agency	
2006	Ι	020237 P. de Bernardis: Cosmologia millimetrica con grandi mosaici di rivelatori	PRIN	
2004	Ι	028417_004 N. Vittorio: Mappe ad alta risoluzione della temperatura e polarizzazione del fondo cosmico di microonde come strumento di indagine cosmologica	PRIN	
2002	PI	Stima della costante di Hubble da misure di effetto S-Z	MURST, Progetto giovani ricercatori	2000,00 €

Part VII – Research Activities

Keywords	Brief Description
Observational cosmology	The main activity pertains Observational Cosmology, with particular focus on

	instrumentation devoted to measurements of the cosmic microwave background (CMB) radiation anisotropy and polarization. This research field is in between astrophysics and fundamental physics, since it investigates the lows of evolution of the full Universe, and the interaction of radiation with the formed Structures in the Universe. In the following, I briefly describe experiments and activities I've been working at in my career.
Cryogenic	Among technological activities, cryogenic has been a field of interest for several years. In particular, I've been working on the realization and operation of the cryogenic system of the BOOMERanG instrument, OLIMPO instrument, LSPE instrument, and coordinator of the Cryogenic Operation Working Group of Planck.
Planck space telescope, for CMB anisotropy and polarization	The Planck satellite is a space based telescope coordinated by the European Space Agency (ESA). It was launched on 14 May 2009 and observed the sky stably and continuously from 12 August 2009 to 23 October 2013. Planck's scientific payload comprised an array of 74 detectors sensitive to frequencies between 25 and 1000 GHz, which scanned the sky with angular resolution between 33 and 5 arcminutes. Planck hosts two instruments: the Low Frequency Instrument (LFI), covering bands centred at 30, 44, and 70 GHz; and High Frequency Instrument (HFI), covering bands centred at 100, 143, 217, 353, 545, and 857 GHz. The main objective of Planck is to measure the spatial anisotropies in the temperature of the cosmic microwave background (CMB), with an accuracy set by fundamental astrophysical limits, thereby extracting essentially all the cosmological information encoded in the temperature anisotropies of the CMB. Planck was also designed to measure to high accuracy the CMB polarization anisotropies, which encode not only a wealth of cosmological information, but also provide a unique probe of the early history of the Universe during the time when the first stars and galaxies formed. Finally, Planck produces a wealth of information on the properties of extragalactic sources and on the dust and gas in the Milky Way. Within the Planck collaboration, I have covered the role of: - member of the HFI Core Team - member of the HFI Core Team - member of the Editorial Board Review Team The main activity concerned the calibration of the HFI, on ground and in-flight. Then, after the end of the mission, the activity shifted to data analysis, scientific exploitation and paper writing. In 2010 a first set of pre-flight papers was issued. In 2011-12 we have published papers of astrophysical interest, such as analysis of the Milky Way emission in the microwave, extragalactic sources, and the study of galaxies clusters by means of the Sunyaev-Zel'dovich effect. In 2013 (issued in 2014) we have published the first cosmological results, whic
OLIMPO balloon telescope, for Sunyaev-Zel'dovich effect on galaxy clusters	OLIMPO is a balloon based telescope for the measurement of the Sunyaev- Zel'dovich effect in galaxy clusters. It is almost completely designed, developed and assembled by the Observational Cosmology group in the Department of Physics of Rome La Sapienza University. The telescope is based on a 2.6 meters primary mirror, and the instrumentation is contained in a 0.3K cryogenic

	system. The instrument consists of 4 multi-detectors arrays at 150, 220, 350 and 480 GHz. The instrumentation has been moved to Svalbard island in the Arctic sea in spring 2014 for the launch campaign. Despite the readiness of the system, it wasn't possible to launch the payload due to weather constrains. Within the OLIMPO experiment, I take care of several tasks, including the observation plan, the management and the software of the attitude control system, the data handling and the data storage, the development and operation of the cryogenic venting system.
Next generation CMB space based experiment, for B-mode polarization mesurements	The European observational cosmology community is proposing a next generation satellite based telescope for the measurement of the polarization of the cosmic microwave background radiation. The objective of this mission is to push to very high accuracy the CMB polarization measurements, in order to try measuring the presence of gravitational waves in the early Universe (~380000 years after Big Bang) by means of their effect in the CMB polarization. The CMB polarization signal encodes the effect of early gravitational waves in a component called the B-mode. These gravitational waves are a prediction of the origin of large scale structures in the Universe. This activity is going on since 2006, and involved four proposals, with the last one currently in preparation. In this framework, my activity consisted in the definition of the systematic effects impacting in particular into the polarization measurements.
Large Scale Polarization Explorer (LSPE): balloon for CMB polarization	The Large Scale Polarization Explorer (LSPE) is a next generation balloon based telescope for microwave polarization measurements at large angular scales. Its objective is to measure the CMB polarization at large scales, where most of the interesting B-modes signal is located. LSPE presents a series of new technologies, such as a Winter Arctic Balloon flight, a cryogenic large size Half Wave Plate polarization modulator, large throughput cold optics, very low noise multimoded bolometers, multiplexer signal readout. With these characteristics, it can provide results with higher sensitivity than Planck, and larger sky coverage with respect to ground based telescope. LSPE is also a test-bed for technologies to be adopted in the next generation satellite missions for the CMB. LSPE is lead by the Observational Cosmology group in Roma La Sapienza. I take care of several tasks, including the observation plan, development of the elevation system of the telescope, management and software of the attitude control system, data handling, simulations for the definition of the instrument requirements.
Technological development	I collaborate to technological development for microwave astronomy, and polarization in particular. I participate to two projects granted by the European Space Agency (ESA) through the Invitation To Tender programme: - ESTEC ITT AO/1-7393/12/NL/MH, coordinated by the National University of Ireland Maynooth (Ireland) for development of innovative focal plane architecture for microwave telescopes. - ESTEC ITT AO/1-7136/12/NL/MH, coordinated by University of Cardiff (UK), for development of large radii, wide bandwidth, Half Wave Plate for microwave radiation. For both projects, I have contributed to the definition of the requirements to be used for the design of the innovative instrumentation.
Boomerang experiment: previous balloon for CMB	The BOOMERanG experiment (Balloon Observations Of Millimetric Extragalactic Radiation and Geophysics) measured the cosmic microwave

anisotropy and polarization	background radiation of a part of the sky during three stratospheric balloon flights. It was the first experiment to make large, high fidelity images of the CMB temperature anisotropies. The BOOMERanG data in1998 determined the angular diameter distance to the surface of last scattering with high precision. When combined with complementary data regarding the value of Hubble's constant, the Boomerang data determined the geometry of the Universe to be flat, supporting the supernova evidence for the existence of dark energy. The 2003 flight of Boomerang resulted in extremely high signal-to-noise ratio maps of the CMB temperature anisotropy in a small sky patch, and one of the first measurements of the polarization of the CMB, and of the correlation of temperature anisotropy and polarization. As member of the BOOMERanG collaboration, I have contributed to several aspects of the experiment, such as design and assembly, cryogenic system, cryogenic operations, in flight operations, on-ground and in-flight calibration, data analysis, and scientific exploitation.
Interstellar dust in the Milky Way with Planck and Herschel	Together with Planck, the ESA Herschel Space Observatory has been in operation from 2009 to 2013. It carried three instruments for sub-millimetre astronomy, and a 3.5 meters wide primary mirror. I have been member of a large collaboration which proposed one of the main Key Programme in the Open Time. This project, named Hi-GAL, had the objective to make a wide map of the galactic plane, two degrees thick, with an angular resolution ranging from 8 arc-seconds, at 70 μ m, to 36 arc-seconds at 500 μ m. Within the collaboration, I worked on the development of the ROMAGAL data analysis pipeline, including noise estimation, time constants deconvolution, mapmaking, and scientific exploitation. Also the Planck telescope has some detector dedicated to observations in the sub-mm band. Both experiments have been used to determine properties of the interstellar dust, such as temperature, optical depth, polarization properties (with Planck only), and spatial distribution.

Part VIII – Summary of Scientific Achievements

SCO1 05 database, Author 1D. 50205510700		
Papers [international]	188	
Start/End	1999/2017	
Papers per year	9.89	
Total Citations	10432	
Average Citation per year	549	
Hirsch (H) index	44	
Normalized H index*	2.31	

SCOPUS database, Author ID: 56265310700

* H index divided by the years since first publication

Francesco Piacentini – Top 10 mostly cited publications – 23/05/2017

- 1. Planck Collaboration, et al.; Planck 2013 results. XVI. Cosmological parameters; Astronomy and Astrophysics; 571; A16; cited by 5131; (2014)
- 2. Planck Collaboration, et al.; Planck 2015 results. XIII. Cosmological parameters; Astronomy and Astrophysics; 594; A13; cited by 3024 (2016)
- 3. de Bernardis, P., et al.; A flat Universe from high-resolution maps of the cosmic microwave background radiation; Nature; 404; 955; cited by 1832 (2000)
- 4. Planck Collaboration, et al.; Planck 2013 results. XXII. Constraints on inflation; Astronomy and Astrophysics; 571; A22; cited by 1439 (2014)
- 5. Planck Collaboration, et al.; Planck 2013 results. I. Overview of products and scientific results; Astronomy and Astrophysics; 571; A1; cited by 997 (2014)
- Netterfield, C. B., et al.; A Measurement by BOOMERANG of Multiple Peaks in the Angular Power Spectrum of the Cosmic Microwave Background; The Astrophysical Journal; 571; 604; cited by 994 (2002)
- 7. Planck Collaboration, et al.; Planck 2015 results. XX. Constraints on inflation; Astronomy and Astrophysics; 594; A20; cited by 971 (2016)
- 8. Planck Collaboration, et al.; Planck 2013 results. XXIV. Constraints on primordial non-Gaussianity; Astronomy and Astrophysics; 571; A24; cited by 615 (2014)
- Jaffe, A. H., et al.; Cosmology from MAXIMA-1, BOOMERANG, and COBE DMR Cosmic Microwave Background Observations; Physical Review Letters; 86; 3475; cited by 523 (2001)
- 10. Planck Collaboration, et al.; Planck 2013 results. XV. CMB power spectra and likelihood; Astronomy and Astrophysics; 571; A15; cited by 496 (2014)