

ERNESTO PALOMBA, CURRICULUM VITAE

Born August 27th 1967 in Rome; Married, three children

Research Scientist at IAPS-INAF, Via Fosso del Cavaliere 100, 00133 Roma, Italia

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Education

- 2001 PhD in Astrophysics and Matter Physics (Université de Provence, Marseille, France). Thesis: Measurement of dust flux emitted by the comet 46P/Wirtanen in the framework of the Rosetta Mission
- 1995 Laurea Degree (110/110) in Physics, specialization Geophysics (La Sapienza University, Rome, Italy). Thesis: Calibration of a Fourier spectrometer devoted to the study of the surface and the atmosphere of Mars

Career

- 2005-Present Staff Researcher at IAPS-INAF, Rome, Italy
- 1999-2005 Staff Researcher at OAC-INAF, Naples, Italy
- 1996-1999 Research Fellow at OAC-INAF, Naples, Italy

Languages

- Italian: Mother Tongue
- English: Reading skills: Very Good Writing skills: Very Good Verbal skills: Very Good
- French: Reading skills: Basic Writing skills: Fair Verbal skills: Basic

Scientific Key Skills

- Design, development and calibration of instruments for the exploration of the Solar System
- Analysis of spectral and hyperspectral Vis-IR data from Planetary Space Missions
- Surface composition of Mars and asteroids, comparison with terrestrial analogues and meteorites (SNC, HED, Carbonaceous Chondrites)
- Analysis of extraterrestrial materials by means of Vis-IR, micro-IR, FESEM, AFM-SNOM

Organizational/managerial skills

Space missions participation

- 2013-2016: Principal Investigator of the CAM (Contamination Assessment Monitoring) project, selected in the framework of the ESA-ITT program (Budget 500 k€, Team of 12 people)
- 2008-2014: Principal Investigator of the Volatile In-Situ Thermogravimetry Analyser (VISTA) instrument
- studied for the A phase of the ESA-M2 Cosmic Vision Marco Polo
 - studied for the A phase and then selected for ESA-M3 Cosmic Vision Marco Polo-R
 - studied for the A phase of the Penetrator Consortium for the mission EJSM/Laplace
 - studied for other proposed Space Missions (*M3* European Venus Explorer (EVE), Titan Aerial Explorer (TAE); *M4* Castalia, Marco Polo 2D)
 - proposed for the Exomars EDM 2016 ESA call within the DREAMS sensor package
- 2015-present Member of the JAXA Solar Power Sail Mission Joint Study Team
- 2014-present Co-Investigator of the NIRS 3 NIR spectrometer onboard the JAXA Hayabusa 2 mission

2013-present	Co-Investigator of the DREAMS (Dust characterization, Risk assessment and Environment Analyzer on the Martian Surface) experiment onboard the ESA-EDM
2011-present	Team member of the NASA Dawn Space Mission
2011-present	Co-investigator of VIRTIS Vis-IR hyperspectral imager onboard the ESA Rosetta mission
2004-present	Co-investigator of the SIMBIOSYS instrument package onboard the ESA Bepi Colombo mission.
2001-present	Co-investigator of GIADA (Grain Impact Analyzer and Dust Accumulator) dust instrument onboard the ESA Rosetta mission
1997-present	Co-Investigator of the Planetary Fourier Spectrometer (PFS) onboard MEX
2006-2012	Co-Investigator of the AOST IR Fourier Transform Spectrometer onboard the IKI Phobos-Grunt mission
2006-2011	Collaborator to the data analysis of the VIRTIS-VEX Vis-IR hyperspectral imager
2001-2006	Co-Investigator of the Planetary Fourier Spectrometer (PFS) onboard VEX
1993-1996	Co-Investigator of the Planetary Fourier Spectrometer (PFS) onboard Mars 96

Projects management

Coordinator of the following National projects:

2012-2014	PRIN INAF “Composition and origin of Dark and Bright materials on Vesta” (Budget 121 k€, Team of 12 people)
2010-2012	TECNO INAF “Feasibility study of a Micro Thermogravimetry/biosensor system for in situ Space missions” (Budget 100 k€, Team of 9 people)
2006-2008	PRIN INAF “Space weathering processes in the Solar System: views from the nanoscale” (Budget 60 k€, Team of 14 people)

Responsible for projects of transfer knowledge between research institutes and industry

2007	Project “Realization of a gas and particulate detector in high temperature environments” (part of the AstroSfera INAF technological skills survey)
2005-2006	Project founded by Pirelli Labs “Feasibility study for the development of a monitoring system of the atmospheric particulate PM 2.5” (Budget 45 k€)

Italian Space Agency projects:

2014	Responsible for the “Study of scientific instruments for the missions Marco Polo-R” project and for the “VISTA” WP (Budget 100 k€)
2011-2013	Responsible for the “VISTA” WP in the “Study of scientific instruments for the missions Marco Polo and Cross Scale” project (Budget 20 k€)
2007-2010	Co-Responsible for the WP “Exploration and future missions to Phobos” in the Study and Exploration of the Solar System” project (Budget 180 k€)
2003-2004	Co-Responsible for the “Sample Return” WP in the ASI project “Mars exploration with NASA” project

Participation to FP7/H2020 projects:

2015-2018	VESPA (Virtual European Solar and Planetary Access)-Europlanet 2020, selected in the framework of the H2020 program to develop a Virtual Observatory for the Planetary Sciences
2014-2017	Eurocares, selected in the framework of the H2020 program to study the feasibility of a European Curation Facility for extraterrestrial material
2012-2015	ASTROMAP, selected in the framework of the FP7 program having the objective the development of a European Astrobiology roadmap
2009-2013	Europlanet selected in the framework of the FP7 program having the objective the development of a scientific network of the Planetary Sciences in Europe

Appointments and memberships

2015	IAU Member
2014-present	EANA (European Astrobiology Network Association) Member
2014-2018	Vice-Chair of the B1 sub-commission “Small Bodies” of the Committee on Space Research (COSPAR)
2014-2016	Main Scientific Organizer of the “Past, Present and Future of Small Body Science and Exploration” Workshop to be held in the framework of the 41 th COSPAR Symposium, Istanbul, Turkey, 2016
2013-present	Senior Scientist of ASDC (ASI Science Data Center)

Other Activities

2014	Guest Editor for the <i>Icarus</i> journal
2010	Coordinator of the project “Emissivity infrared spectra of mineral mixtures to investigate the composition of the Phobos surface” selected in the framework of the Trans National Access of Europlanet
2008-present	Coordinator of ETNA (Extra-Terrestrial Nanomaterials Analysis), research network including five Institutes: IAPS-INAF, ISM-CNR, Earth Science Department of the La Sapienza University, the Physics Department of Roma Tre University and the Astronomical Observatory of Turin
2002-2003	Collaborator to the Near-Earth Objects Survey (NEO’s) at Campo Imperatore Observatory, L’Aquila, Italy
2000	Co-Organizer & Chair of the special session “Laboratory Simulations of Circumstellar Dust Analogs: Expectations for Comet Nucleus Encounter” for the 64th Annual Meeting of the Meteoritical Society

Referee for: *Planetary and Space Science*, *Robotics and Autonomous Systems* journals, the Netherlands Organisation for Scientific Research, PRIN-INAF projects and PhD thesis

Author and co-author of more than 300 publications (<http://bit.ly/1M110gi>), 67 of which peer reviewed (<http://bit.ly/1M1kPBt>),

More than 40 talks/seminars at international conferences, workshops & instruments meetings

Academic and outreach activity

- Tutor of Graduation (Laurea) Thesis in Astrophysics and Planetary Sciences (A.Y. 2004, 2005, 2006, 2007, 2013) Federico II Naples University and La Sapienza Rome University
- Tutor for the PhD project “Unveiling the dwarf planet Ceres by means of VIR-Dawn hyperspectral data” (A.Y.2015-2017) Budget (60 k€)
- PhD Tutor in Radar and Remote sensing (A.Y. 2009-2011; 2013-2016) La Sapienza Rome University
- Assistant Professor for the Astrophysics Laboratory course Federico II Naples University and the Physics course Parthenope University(A.Y. 1996-1997, 1999-2000, 2000-2001, 2001-2002)
- Astronomy Lessons for High Schools (S.Y. 2002-2003, 2003-2004)
- Astronomy Lessons for kids “Astrokids” in collaboration with Feltrinelli Libraries (2013-2014)
- Scientific Referee Member of the Astronomy Olympic Games (2010-2011, 2011-2012)
- Collaboration with “TuttoScienze” scientific Section of the “La Stampa” newspaper
- Interactive Seminar (video/pc) “Activity of development and realization of Space sensors”, Rosetta Knowledge Management Video Approach – ESA production, Florence, 24th -28th June 2003

Detailed Work Experience

- Dates (from – to) 2005-present
- Name address of employer INAF-IAPS
Via Fosso del Cavaliere 100, 00133, Rome, Italy
- Type of business or sector Astrophysics and Planetary Space Science
- Position Research Scientist
- Main activities/responsibilities Science Lead of a Research group consisting of 1 Staff Researcher, 2 laboratory technicians, 1 Research Fellow and 2 PhD students.
PFS-MEX data analysis:
study of the minor components of the Martian surface, such as carbonates, found to be present in the finest fraction of the Martian regolith; analysis of the albedo properties of the Martian surface; comparative study with previous data (TES-MGS) that reveals the influence of the atmospheric dust dynamic on the albedo changes of the Martian surface, write papers.
Collaboration with the VIRTIS-VEX team:
limb darkening analysis by using the IR hyperspectral data. write papers.
DREAMS-EDM activity:
analysis of scientific goals of the EDM mission, participation to Team meetings.
Dawn Team member activity:
coordination of a working group for the study of the bright and dark regions on Vesta; Guest editor of the Icarus Journal special Issue: “Dark and bright materials on Vesta”; study of the mineralogy and compositional diversity of the Vesta surface, discovery of olivine deposits and hydrated minerals in low albedo regions; participation to the analysis of the thermal and photometric properties of the various geomorphological features (e.g. impact craters, landslides), write papers and funding proposals; project management; participation to Team meetings
VIRTIS-Rosetta data analysis:
compositional analysis and spectral end-member deconvolution, photometric behavior of the nucleus, discovery of organic compounds and absence of hydrated materials on the surface nucleus, dust properties, participation to Team meetings
GIADA-Rosetta data analysis:
observations of cometary dust grains coming from the nucleus and reflected by the Solar wind; detection of compact and fluffy grains, participation to Team meetings, write papers.
ASTROMAP FP7 project:
Organization of the “Origin of the solar system – the astrobiology point of view” workshop
Co-author of the Europe ‘s First Astrobiology Roadmap that will be presented at the next European Planetary Science Congress during the Astrobiology day (28th of September).
VISTA
Coordination of all the activities. Phase A study of VISTA for Marco Polo, Marco Polo R and the Penetrator Consortium for

EJSM/Laplace; design of proximity and main electronics; development of a sensor breadboard; cryogenic and thermo-vacuum tests; write papers, proposals for funding and for ESA call for Instruments; project management; reporting to ESA and ASI; write paragraphs for the Marco Polo-R Assessment Study Report (ESA/SRE 2013)

CAM

Coordination of all the activities. Review of the Piezoelectric Quartz Microbalance use in Space; design of proximity and main electronics; development of a sensor breadboard; cryogenic and thermo-vacuum tests; Design and development of an Engineering model (EM); EM Tests; project management; reporting to ESA, weekly Team telecom.

Eurocares:

Initial phase of the project, review of the microscope and imaging facilities for extraterrestrial material analysis; review of the methods for the recovery/transport of Mars or Lunar/asteroid samples from the landing site to the curatorial facility

Solar Power Sail Mission:

It will be proposed as a technological mission to JAXA discussion phase to decide payload of the “Mother Spacecraft” and the Lander, Telecon, Videocon and meetings collaboration with the Japanese PI of the Vis-NIR Spectral Imager

SIMBIOSYS, NIRS 3:

Preparatory activity waiting for the Observation Phase of the missions; participation to Team meetings.

AOST:

Support to the design of the instrument, hardware parts procurement, participation to Team meetings, writing funding proposals and reports, project management.

COSPAR:

Activity for the organization of the workshop, contacting Scientists for the Scientific Organizing Committee.

EUROPLANET: For the first time a Virtual Observatory of Planetary Data is developed/tested. The following upgrade of this version is presented with the VESPA (Virtual European Solar and Planetary Access) proposal, that is integrated in the big proposal Europlanet 2020.

- Dates (from – to) 1996-2005
- Name and address of employer INAF-Osservatorio Astronomico di Capodimonte
Via Moiariello 16 80131 Naples, Italy
- Type of business or sector Astrophysics and Planetary Space Science
- Position held PhD Student-Research Fellow-Research Scientist
- Main activities/responsibilities *Activity for PFS Mars '96-MEX:*
Physical, chemical and spectroscopic characterization of Martian analogues in Laboratory to support to the PFS-MEX data analysis; the objective was to create a spectral library at different grain sizes to be compared with the data acquired on Mars. Use of the following analytical techniques: Infrared

micro-spectroscopy, IR and morphological/chemical (SEM-EDX) analysis of extraterrestrial materials (meteorites and IDP's) and martian analogues. In collaboration with the Polish Academy of Sciences, study of Martian atmosphere models: simulation of emitted radiance and dust contribution, by using Mie scattering models and Modtran. For a comparative analysis with the long wavelength channel of PFS, the entire dataset of the Thermal Emission Spectrometer (TES) onboard the Mars Global Surveyor is downloaded and analyzed.

Responsible for the production and development of the MBS (Microbalance Sensor) sub-system for the GIADA (Grain Impact Analyser and Dust Accumulator) experiment; this system consists in five QCM (Quartz Crystal Microbalance) sensors. Laboratory characterization of QCM's: study of the coating production methods for microbalances, determination of their sensitivity to dust deposition, cryogenic and thermal tests; preparation of monthly reports to ESA.

Most of the GIADA activity covered the PhD period and the postdoc and include collaboration with Dr. Jean Marie Perrin (Observatoire de Provence, France), Prof. J.J. Lopez Moreno team (Instituto de Astrofísica de Andalucía-CSIC, Spain), Thomas Henning team (Jena University, Germany), Prof. R. Rudenauer (Austrian Research Centre, Austria)

Collaboration to the MEDUSA (Martian Environmental DUSt Systematic Analyser) instrument proposal for the Exomars program, which included microbalances for the measurement of dust and ice condensation.

Participation to the Symbiosis proposal for the Bepi Colombo Space Mission.

Coordination of a 4 persons team for the "Feasibility study for the development of a monitoring system of the atmospheric particulate PM 2.5" for the Pirelli Labs Company.

- Dates (from – to) 1993-1995
- Name and address of employer Consiglio Nazionale delle Ricerche-IFSI
Via G. Galilei 00044 Frascati (Roma), Italy
- Type of business or sector Astrophysics and Planetary Space Science
- Occupation or position held Undergraduate Student
- Main activities/responsibilities Under the direction of the Professor V. Formisano. Co-Investigator in the Planetary Fourier Spectrometer (PFS) experiment, onboard the Mars'96 mission payload. During the development phase, performance test of several optical components, in terms of reflectivity and transmittance, linearity and thermal responsivity tests onto infrared detectors. Radiometric calibrations and analysis of the spectroscopic performances of PFS In the development phase of the PFS flight model and Spare. Calibration and data analysis software development. Close collaboration with several European Institutes: I.K.I., Russia, l'Instituto de Astrofísica de Andalucía (CSIC) Spain and l'Observatoire de Paris, France