



# Roberto Peron

## *Curriculum Vitæ of Roberto Peron*

*Curriculum vitæ updated to April 11, 2018*

### In short

I am a **theoretical physicist**. My research field is the **fundamental physics of gravitation and spacetime**, together with testing the gravitational theories with **space experiments**. By using **advanced techniques of orbit determination**, I directly contributed to testing in the field of the Earth (via the geodetic satellites **LAGEOS, LAGEOS II** and more recently **LARES**) specific predictions of general relativity theory: the **Lense-Thirring precession** and (first published measurement) the **Schwarzschild precession**. I am deeply involved in the development of instrumentation and procedures for the study of gravitation in the context of space missions (particularly the ESA mission **BepiColombo**, and I took part in the elaboration of proposals for the **exploration of several Solar System bodies**). A specific research interest is the application of relativistic ideas to metrologic problems, with particular regard to the improvement of current **satellite navigation** systems. Since several years I am actively involved with responsibility roles in the organization of international meetings, being also **editor** of several books.

### Bibliometric identifiers

ORCID 0000-0002-1774-5725  
Scopus 25223506800  
publons 1321298  
ResearcherID G-2282-2018

### Main scientific and professional results

For the details on the related publications, see section *Publications with peer-review*

- 2004 **Characterization of non-gravitational perturbations acting on the LAGEOS II satellite**: Lucchesi, D., Ciufolini, I., Andrés, J., Pavlis, E., **Peron, R.**, Noomen, R. and Currie, D., Plan. Space Sci. **52**, 699

- 2005 **Editor** of the book *Gravitation: From the Hubble Length to the Planck Length*, IOP Publishing
- 2006 **Experimental test of the “Lense-Thirring” relativistic gravitomagnetic effect around the Earth and Measurement of large-scale geophysical phenomena in the orbit of LAGEOS and LAGEOS II satellites**: Ciufolini, I., Pavlis, E. and **Peron, R.**, *New Astron.* **11**, 527  
**Editor** of the book *Recent Developments in Gravitational Physics: Proceedings of the 15th SIGRAV Conference on General Relativity and Gravitational Physics*, Institute of Physics Conference Series, Taylor and Francis
- 2009 **Responsible** for WP2.1 and WP5, accordo ASI-INAf I/014/09/0 “Accelerometro differenziale per GReAT”
- 2010 **First published measurement of the “Schwarzschild” relativistic gravitoelectric precession around Earth and bounds on a possible “Yukawa” non-Newtonian potential**: Lucchesi, D.M., **Peron, R.**, *Phys. Rev. Lett.* **105**, 231103  
**Steering Committee member** and **responsible** for WP3130, WP3310, WP3410, Bepi Colombo (SIMBIOSYS, ISA, PHEBUS, MIXES, SIXS, MEA) - Attività scientifica — Fase B2/C, Accordo n. I/022/10/0, Agenzia Spaziale Italiana, Esperimento ISA
- 2011 **Co-Investigator** ISA accelerometer for ESA mission BepiColombo
- 2014 **Invited** to give the lecture *Solar System Tests of General Relativity*, DPG Physics School on General Relativity @ 99 — Physikzentrum Bad Honnef, Germany, 18 September 2014  
ISA accelerometer **representative** in the BepiColombo Data Handling and Archiving Working Group  
**Error analysis on the measurement of the “Schwarzschild” relativistic gravitoelectric precession around Earth and of the bounds on a possible “Yukawa” non-Newtonian potential**: Lucchesi, D.M., **Peron, R.**, *Phys. Rev. D* **89**, 082002  
**Responsible** for Task 21, “Galileo and Accelerometry (GALAC)”, project funded by European Space Agency  
*The ODINUS Mission Concept proposal* for a joint mission to Uranus and Neptune, submitted to ESA selection for L2 and L3 missions, and **evaluated by ESA as appropriate for an L-class mission**: Turrini, D., Politi, R., **Peron, R.**, Grassi, D., Plainaki, C., Barbieri, M., M. Lucchesi, D.M., Magni, G., Altieri, F., Cottini, V., Gorius, N., Gaulme, P., Schmider, F.-X., Adriani, A., Piccioni, G., *Plan. Space Sci.* **104**, 93
- 2016 **Editor** of the book *Gravity: Where Do We Stand?*, Springer
- 2017 **Manager** of WP-400, project “Expert support to ISA Science Operations — Bepi-Colombo”, RFP IPL-PSS/JD/251.2016, funded by European Space Agency  
**Measurement of the secular decay of the LARES satellite**: Pardini, C., Anselmo, L., Lucchesi, D.M., **Peron, R.**, *Acta Astronautica* **140**, 469

## Scientific expertise

- o Experimental tests of the general relativity theory

- Precise orbit determination: data analysis, celestial mechanics, modelization of gravitational and non-gravitational perturbations
- Gravitation physics
- Development of instrumentation and procedures for planetary exploration missions: calibration; data handling, analysis and archiving
- Geodesy and geophysics: gravitational field and rotation of celestial bodies
- Navigation: GNSS systems

## Publications summary

- 25 publications on journals with peer-review
- 14 publications on journals without peer-review
- 3 books (as editor)
- 3 book chapters
- 2 contributions to white books
- 7 technical documents
- h-index: 8 (source: Scopus)

## Computer experience

Operating systems	Unix, Linux, Windows	Administration	Linux systems, Websites
Programming	Fortran	Scripting	Bash, Python
Scientific software	Matlab	Typography	LaTeX

## Languages

Italian	Native speaker
English	Very good knowledge, written and spoken

## Education

- 19/07/2005 **PhD in Physics**, *Università di Lecce (Dipartimento di Fisica)*, Thesis title: *A measurement of frame-dragging in the orbits of LAGEOS and LAGEOS II satellites using Geodyn software*, Relatore Prof. Ignazio Ciufolini.
- 11-12/2002 **Stage**, *University of Maryland Baltimore County (UMBC)*, Orbit determination of geodynamic satellites for tests of general relativity theory (with Prof. Erricos C. Pavlis).
- 25/10/2001 **Master in Physics**, *Università degli Studi di Roma "La Sapienza" (Dipartimento di Fisica)*, Thesis title: *Misura del gravitomagnetismo mediante satelliti inseguiti via laser*, Relatore Prof. Carlo Bernardini, Relatore esterno Prof. Ignazio Ciufolini, 105/110 grade.
- 28/01/2000-26/02/2000 **Stage**, *NASA Goddard Space Flight Center (GSFC), Greenbelt, MD, USA*, Learning and use of orbit determination software Geodyn II (with Prof. Erricos C. Pavlis).

07/1995 **Diploma di maturità scientifica**, *Liceo Scientifico Statale "Isacco Newton", Roma*, 60/60 grade.

## Current position

01/02/2013- **Researcher "Tempo Determinato"**, *Istituto di Astrofisica e Planetologia Spaziali (IAPS-INAF)*.

**ISA Co-Investigator**, ISA accelerometer for BepiColombo mission.

**ISA representative in BepiColombo Data Handling and Archiving Working Group**, ISA accelerometer for BepiColombo mission.

2016- **Co-lecturer**, *Course "Gravitational Physics", Dipartimento di Fisica, Università degli Studi di Roma "Tor Vergata"*.

01/09/2013- **Associate**, *INFN sezione Roma Tor Vergata*.

2014- **Associate**, *Committee on Space Research (COSPAR)*.

2015- **Associate**, *International Laser Ranging Service (ILRS)*.

## Previous positions

01/07/2011- **Borsa di Studio**, *Istituto di Astrofisica e Planetologia Spaziali (IAPS-INAF)*, Collaborazione con il Dott. Valerio lafolla.

02/05/2007- **Assegno di ricerca**, *Istituto di Fisica dello Spazio Interplanetario (IFSI-INAF)*, Collaborazione con il Dott. Valerio lafolla nell'ambito del Progetto di Ricerca ISA BepiColombo.

23/11/2006- **Collaborazione professionale esterna**, *Istituto di Fisica dello Spazio Interplanetario (IFSI-INAF)*, Collaborazione con il Dott. Valerio lafolla.

26/01/2006- **Collaborazione professionale esterna**, *Istituto di Fisica dello Spazio Interplanetario (IFSI-INAF)*, Collaborazione con il Dott. Valerio lafolla.

01/09/2001- **Collaborazione professionale esterna**, *Istituto di Fisica dello Spazio Interplanetario (IFSI-CNR)*, Collaborazione con il Prof. Ignazio Ciufolini.

01/06/2000- **Contratto d'opera e prestazioni di lavoro autonomo**, *Istituto di Fisica dello Spazio Interplanetario (IFSI-CNR)*, Collaborazione con il Prof. Ignazio Ciufolini nell'ambito dei Progetti di Ricerca LAGEOS e LARES.

## Scientific activity

- Study of general relativistic effects in the Earth field via the Satellite Laser Ranging technique
- Development of ISA accelerometer for BepiColombo mission
- Test of Equivalence Principle: experiments GReAT, GG
- Solar System exploration: MAGIA and ODINUS proposals
- Satellite navigation: development of new technologies and scientific impact

## Responsibility in research projects

- 2009 Accordo ASI-INAF I/014/09/0 “Accelerometro differenziale per GReAT”, responsible for: WP2.1 “Definizione requisiti di prestazione”, WP5 “Divulgazione Scientifica”.
- 2010 Bepi Colombo (SIMBIOSYS, ISA, PHEBUS, MIXES, SIXS, MEA) - Attività scientifica — Fase B2/C, Accordo n. I/022/10/0, Agenzia Spaziale Italiana, Esperimento ISA, Steering Committee member, in WP1300 “ISA SCIENCE” responsible of: Subtask 3130 “Divulgazione scientifica”, Subtask 3310 “Definizione del Calibration Plan”, Subtask 3410 “Pianificazione delle operazioni scientifiche”.
- 2014 “Galileo and Accelerometry (GALAC)”, project funded by European Space Agency, responsible of Task 21 “Evaluation of unmodeled perturbing forces”.
- 2017 “Expert support to ISA Science Operations — BepiColombo”, RFP IPL-PSS/JD/251.2016, project funded by European Space Agency, Manager of WP-400 “Science Data Processing and Archiving”

## Research proposals and mission studies

- 2008 ISA (ITALIAN SPRING ACCELEROMETER) — Notice Of Intent (NOI) — Response to REQUEST FOR INFORMATION (RFI) Instruments for U.S. ILN Lunar Missions (**Co-proposer**)  
MAGIA — Missione Altimetrica Gravimetrica geochimica lunAre
- 2009 ISA (ITALIAN SPRING ACCELEROMETER) — Response to ESA First Lunar Lander: Request for Information (**Co-proposer**)
- 2012 Galileo Galilei (GG): a small mission to test the weak equivalence principle of Galileo, Newton and Einstein to  $10^{-17}$  (**Co-proposer**)  
MOOn Subsurface Explorer — MOOSE (formerly Missione Altimetrica Gravimetrica geochimica lunAre — MAGIA), Proposal in response to the “2012 Call for a Small Mission opportunity in ESA’s Science Programme for a launch in 2017” (**Co-proposer**)
- 2013 The ODINUS Mission Concept — The Scientific Case for a Mission to the Ice Giant Planets with Twin spacecraft to Unveil the History of our Solar System (**Co-proposer**)  
The Science Case for an Orbital Mission to Uranus — Exploring the Origins and Evolution of Ice Giant Planets, A paper submitted in response to the ESA 2013 Call for White Papers for the Definition of the L2 and L3 Missions in the ESA Science Programme (**Co-proposer**)
- 2015 Galileo Galilei (GG): a mission to test the founding pillar of General Relativity to  $10^{-17}$ , Submitted 15 January 2015 in response to “Call for a medium-size mission opportunity in ESA’s Science Programme for a launch in 2025 (M4)” (**Supporting scientist**)
- 2016 LAGRANGE, Letter of Intent submitted 5 May 2016 in response to “Call for new science ideas in ESA’s Science Programme” (**Co-proposer**)  
Galileo Galilei (GG): a mission to test the founding pillar of General Relativity to  $10^{-17}$ , Submitted 5 October 2016 in response to “Call for a medium-size mission opportunity in ESA’s Science Programme (M5)” (**Supporting scientist**)

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## Awards and recognitions

- 2008 The communication *TEPEE/GReAT (General Relativity Accuracy Test in an Einstein Elevator): ready to start* at the XCIV Congresso Nazionale Società Italiana di Fisica, Genova, September 22-27, 2008, presented by myself, has been awarded as the second best communication of Sezione III: Astrofisica e fisica cosmica.
- 2010 The article *Accurate Measurement in the Field of the Earth of the General-Relativistic Precession of the LAGEOS II Pericenter and New Constraints on Non-Newtonian Gravity*, Phys. Rev. Lett. **105**, 231103 (2010), has been selected as *Editor's Suggestion*, and as subject for a *Viewpoint in Physics*.

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## News and media coverage

- 2010 Article by D. Rubincam, *Via satellite — A Viewpoint on: Accurate Measurement in the Field of the Earth of the General-Relativistic Precession of the LAGEOS II Pericenter and New Constraints on Non-Newtonian Gravity*, Physics **3**, 100 (2010)  
MEDIA INAF news, *Einstein ha di nuovo ragione*, 3 December 2010  
MEDIA INAF news, *L'astrofisica che «mi piace»*, 28 December 2010
- 2014 Article on the site "Technology.org", *Uranus and Neptune exploration could be the next ESA milestone*, on ODINUS proposal, 13 February 2014  
Article on the site "Medium", *Astronomers Make the Case for a Mission to Neptune and Uranus*, on ODINUS proposal, 17 February 2014  
Article on the site "La Voix de la Russie", *Les géants glacés du Système solaire*, on ODINUS proposal, 21 February 2014  
MEDIA INAF news, *Alla scoperta di Urano e Nettuno*, 24 February 2014  
MEDIA INAF news, *Tredici anni di orbite per confermare Einstein*, 5 May 2014  
Article on the site "Centauri Dreams", *Return to the Ice Giants*, on ODINUS proposal, 18 June 2014  
Article on the site "Centauri Dreams", *Outer Planet Exploration Strategies*, on ODINUS proposal, 19 June 2014

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## Meetings organization

- 2009 Member of the **Scientific and Organizing Committee**, SIGRAV Graduate School in Contemporary Relativity and Gravitational Physics, VIII Edition, Gravity: Where do we stand? — Villa Olmo, Como, May 11-15, 2009
- 2010 Member of the **Local Organizing Committee**, International Workshop on Paolo Farinella (1953-2000): the scientist and the man — Università degli Studi di Pisa, Pisa, June 14-16, 2010
- 2012 **Chair** of sessions SG1 and SG2 — *GR around the Earth and the Sun* —, 13th Marcel Grossmann Meeting, Stockholm, July 1-7, 2012
- 2015 **Chair** of session *Relativistic Metrology*, 2nd IEEE International Workshop on Metrology for Aerospace, Benevento, June 4-5, 2015

- Chair** of session PT5 — *GR in the Solar System* —, 14th Marcel Grossmann Meeting, Stockholm, July 12-18, 2015
- 2016 **Chair** of session *Relativistic Metrology*, 3rd IEEE International Workshop on Metrology for Aerospace, Firenze, June 22-23, 2016
- 2017 **Chair** of session *Relativistic Metrology*, 4th IEEE International Workshop on Metrology for Aerospace, Padova, June 21-23, 2017
- 2018 **Technical Program Co-Chair**, 5<sup>th</sup> IEEE International Workshop on Metrology for Aerospace, Roma, 20-22 June 2018
- Deputy Organizer** of session *Applications (Geodesy, Metrology, Navigation, and Others)*, 42nd COSPAR Scientific Assembly, Pasadena, CA, USA, 14-22 July 2018

## Editor

- 2005 Ciufolini, I., Coccia, E., Gorini, V., **Peron, R.**, Vittorio, N. (ed.), *Gravitation: From the Hubble Length to the Planck Length*, IOP Publishing
- 2006 Ciufolini, I., Coccia, E., Colpi, M., Gorini, V., **Peron, R.** (ed.), *Recent Developments in Gravitational Physics: Proceedings of the 15th SIGRAV Conference on General Relativity and Gravitational Physics*, Institute of Physics Conference Series, Taylor and Francis
- 2016 **Peron, R.**, Colpi, M., Gorini, V., Moschella, U. (ed.), *Gravity: Where Do We Stand?*, Springer

## Activity as referee

Referee for the following journals:

- Advances in Space Research
- Aerospace
- Classical and Quantum Gravity
- European Physical Journal C
- General Relativity and Gravitation
- Sensors
- South African Journal of Geology

Referee for the following publications:

- Sciences of Geodesy — II, Edited by Guochang Xu, Springer Berlin Heidelberg, 2013

Referee for the following projects:

- Assessment of research proposal for the National Research Foundation, Blue Skies Research Programme, South Africa, 2014

## Publications with peer-review

- 2004 Lucchesi, D., Ciufolini, I., Andrés, J., Pavlis, E., **Peron, R.**, Noomen, R. and Currie, D., *LAGEOS II perigee rate and eccentricity vector excitations residuals and the Yarkovsky-Schach effect*, Plan. Space Sci. **52**, 699, doi:10.1016/j.pss.2004.01.007

- 2006 Ciufolini, I., Pavlis, E. and **Peron, R.**, *Determination of frame-dragging using Earth gravity models from CHAMP and GRACE*, *New Astron.* **11**, 527, doi:10.1016/j.newast.2006.02.001
- 2007 Zieliński, J. B., Gałazka, R. R., **Peron, R.**, *On possible determination of the speed of the gravity signal in space with help of gradiometry*, *Artificial Satellites* **42**, 129, doi:10.2478/v10018-008-0005-0
- 2008 Iafolla, V., Fiorenza, E., Lefevre, C., Nozzoli, S., **Peron, R.**, Persichini, M., Reale, A., Santoli, F., Lorenzini, E. C., Shapiro, I. I., Ashenberg, J., Bombardelli, C. and Glashow, S., *TEPEE/GReAT (General Relativity Accuracy Test in an Einstein Elevator): ready to start*, *Nuovo Cim. C* **31**, 497, doi:10.1393/ncc/i2009-10318-7
- 2010 Iafolla, V., Fiorenza, E., Lefevre, C., Morbidini, A., Nozzoli, S., **Peron, R.**, Persichini, M., Reale, A., Santoli, F., *Italian Spring Accelerometer (ISA): a fundamental support to BepiColombo Radio Science Experiments*, *Plan. Space Sci.* **58**, 300, doi:10.1016/j.pss.2009.04.005
- Lucchesi, D.M., **Peron, R.**, *Accurate Measurement in the Field of the Earth of the General-Relativistic Precession of the LAGEOS II Pericenter and New Constraints on Non-Newtonian Gravity*, *Phys. Rev. Lett.* **105**, 231103, doi:10.1103/PhysRevLett.105.231103
- 2013 **Peron, R.**, *Einstein is still right: new tests of gravitational dynamics in the field of the Earth*, *Nuovo Cim. C* **36**, 125, doi:10.1393/ncc/i2013-11493-6
- Peron, R.**, *On the use of combinations of laser-ranged satellites orbital residuals to test relativistic effects around Earth*, *Mon. Not. R. Astron. Soc.* **432**, 2591, doi:10.1093/mnras/stt621
- Nobili, A.M., Lucchesi, D.M., Crosta, M.T., Shao, M., Turyshev, S.G., **Peron, R.**, Catastini, G., Anselmi, A., Zavattini, G., *On the universality of free fall, the equivalence principle and the gravitational redshift*, *Am. J. Phys.* **81**, 527, doi:10.1119/1.4798583
- 2014 Iafolla, V., Lefevre, C., Fiorenza, E., Santoli, F., Nozzoli, S., Magnafico, C., Lucente, M., Lucchesi, D., **Peron, R.**, Shapiro, I.I., Glashow, S., Lorenzini, E.C., *Measurement of the quality factor of a new low-frequency differential accelerometer for testing the equivalence principle*, *Rev. Sci. Instr.* **85**, 014502, doi:10.1063/1.4861349
- Lucchesi, D.M., **Peron, R.**, *The LAGEOS II pericenter general relativistic precession (1993–2005): error budget and constraints in gravitational physics*, *Phys. Rev. D* **89**, 082002, doi:10.1103/PhysRevD.89.082002
- Peron, R.**, *Testing general relativistic predictions with the LAGEOS satellites*, *Advances in High Energy Physics*, vol. 2014, 791367, doi:10.1155/2014/791367
- Peron, R.**, Iafolla, V., Fiorenza, E., Lefevre, C., Lucchesi, D.M., Lucente, M., Magnafico, C., Santoli, F., Lorenzini, E.C., Anselmo, L., Pardini, C., *Investigating fundamental physics and the space environment with a dedicated Earth-orbiting spacecraft*, *Metrology for Aerospace (MetroAeroSpace)*, 2014 IEEE, 255-259, doi:10.1109/MetroAeroSpace.2014.6865930



- Turrini, D., Politi, R., **Peron, R.**, Grassi, D., Plainaki, C., Barbieri, M., M. Lucchesi, D.M., Magni, G., Altieri, F., Cottini, V., Gorius, N., Gaulme, P., Schmider, F.-X., Adriani, A., Piccioni, G., *The comparative exploration of the ice giant planets with twin spacecraft: Unveiling the history of our Solar System*, Plan. Space Sci. **104**, 93, doi:10.1016/j.pss.2014.09.005
- Arridge, C.S., Achilleos, N., Agarwal, J., Agnor, C.B., Ambrosi, R., André, N., Badman, S.V., Baines, K., Banfield, D., Barthélémy, M., Bisi, M.M., Blum, J., Bocanegra-Bahamon, T., Bonfond, B., Bracken, C., Brandt, P., Briand, C., Briois, C., Brooks, S., Castillo-Rogez, J., Cavalié, T., Christophe, B., Coates, A.J., Collinson, G., Cooper, J.F., Costa-Sitja, M., Courtin, R., Daglis, I.A., de Pater, I., Desai, M., Dirkx, D., Dougherty, M.K., Ebert, R.W., Filacchione, G., Fletcher, L.N., Fortney, J., Gerth, I., Grassi, D., Grodent, D., Grün, E., Gustin, J., Hedman, M., Helled, R., Henri, P., Hess, S., Hillier, J.K., Hofstadter, M.H., Holme, R., Horanyi, M., Hospodarsky, G., Hsu, S., Irwin, P., Jackman, C.M., Karatekin, O., Kempf, S., Khalisi, E., Konstantinidis, K., Krüger, H., Kurth, W.S., Labrianidis, C., Lainey, V., Lamy, L.L., Laneuville, M., Lucchesi, D., Luntzer, A., MacArthur, J., Maier, A., Masters, A., McKenna-Lawlor, S., Melin, H., Milillo, A., Moragas-Klostermeyer, G., Morschhauser, A., Moses, J.I., Mousis, O., Nettelmann, N., Neubauer, F.M., Nordheim, T., Noyelles, B., Orton, G.S., Owens, M., **Peron, R.**, Plainaki, C., Postberg, F., Rambaux, N., Retherford, K., Reynaud, S., Roussos, E., Russell, C.T., Rymer, A.M., Sallantin, R., Sánchez-Lavega, A., Santolík, O., Saur, J., Sayanagi, K.M., Schenk, P., Schubert, J., Sergis, N., Sittler, E.C., Smith, A., Spahn, F., Srama, R., Stallard, T., Sterken, V., Sternovsky, Z., Tiscareno, M., Tobie, G., Tosi, F., Trieloff, M., Turrini, D., Turtle, E.P., Vinatier, S., Wilson, R., Zarka, P., *The science case for an orbital mission to Uranus: Exploring the origins and evolution of ice giant planets*, Plan. Space Sci. **104**, 122, doi:10.1016/j.pss.2014.08.009
- 2015 Lucchesi, D.M., Anselmo, L., Bassan, M., Pardini, C., **Peron, R.**, Pucacco, G., and Visco, M., *Testing the gravitational interaction in the field of the Earth via Satellite Laser Ranging and the LAser RANged Satellites Experiment (LARASE)*, Class. Quantum Grav. **32**, 155012, doi:10.1088/0264-9381/32/15/155012
- Iafolla, V., Fiorenza, E., Lefevre, C., Lucchesi, D.M., Lucente, M., Magnafico, C., Nozzoli, S., **Peron, R.**, Santoli, F., Lorenzini, E.C., Milyukov, V., Shapiro, I.I., Glashow, S., *A proposal for a test of Weak Equivalence Principle with improved accuracy using a cryogenic differential accelerometer installed on a pendulum*, Metrology for Aerospace (MetroAeroSpace), 2015 IEEE, 61-65, doi:10.1109/MetroAeroSpace.2015.7180627
- Lucchesi, D.M., **Peron, R.**, Visco, M., Anselmo, L., Pardini, C., Bassan, M., Pucacco, G., *Fundamental physics in the Field of the Earth with the LAser RANged Satellites Experiment (LARASE)*, Metrology for Aerospace (MetroAeroSpace), 2015 IEEE, 71-76, doi:10.1109/MetroAeroSpace.2015.7180629
- 2016 Iafolla, V., Fiorenza, E., Lefevre, C., Lucchesi, D.M., Lucente, M., Magnafico, C., Nozzoli, S., **Peron, R.**, Santoli, F., Lorenzini, E.C., Milyukov, V., Shapiro, I.I., Glashow, S., *A proposal for a Weak Equivalence Principle test with improved accuracy using a cryogenic differential accelerometer installed on a pendulum*, Adv. Space Res. **57**, 715, doi:10.1016/j.asr.2015.11.013

- Lucchesi, D.M., Santoli, F., **Peron, R.**, Fiorenza, E., Lefevre, C., Lucente, M., Magnafico, C., Iafolla, V.A., Kalarus, M., Zielinski, J, *Non-Gravitational accelerations measurements by means of an on-board accelerometer for the Second Generation Galileo Global Navigation Satellite System*, Metrology for Aerospace (MetroAeroSpace), 2016 IEEE, 423-433, doi:10.1109/MetroAeroSpace.2016.7573253
- Lucchesi, D.M., Magnafico, C., **Peron, R.**, Visco, M., Anselmo, L., Pardini, C., Bassan, M., Pucacco, G., Stanga, R., *Measurements of General Relativity precessions in the field of the Earth with laser-ranged satellites and the LARASE program*, Metrology for Aerospace (MetroAeroSpace), 2016 IEEE, 522-529, doi:10.1109/MetroAeroSpace.2016.7573270
- Iafolla, V., Fiorenza, E., Lefevre, C., Lucchesi, D.M., Lucente, M., Magnafico, C., **Peron, R.**, Santoli, F., *The BepiColombo ISA accelerometer: ready for launch*, Metrology for Aerospace (MetroAeroSpace), 2016 IEEE, 538-544, doi:10.1109/MetroAeroSpace.2016.7573273
- 2017 **Peron, R.**, Lorenzini, E.C., *METRIC: a dedicated Earth-orbiting spacecraft for investigating gravitational physics and the space environment*, Aerospace **4**, 38, doi:10.3390/aerospace4030038
- Lucchesi, D.M., Magnafico, C., **Peron, R.**, Visco, M., Anselmo, L., Pardini, C., Bassan, M., Pucacco, G., Stanga, R., *The LARASE research program. State of the art on Modelling and Measurements of General Relativity effects in the field of the Earth: a preliminary measurement of the Lense-Thirring effect*, Metrology for Aerospace (MetroAeroSpace), 2017 IEEE, 131-145, doi:10.1109/MetroAeroSpace.2017.7999552
- Pardini, C., Anselmo, L., Lucchesi, D.M., **Peron, R.**, *On the secular decay of the LARES semi-major axis*, Acta Astronautica **140**, 469, doi:10.1016/j.actaastro.2017.09.012

## Publications without peer-review

- 2002 **Peron, R.**, *Latest results on the measurement of the Lense-Thirring effect with the LAGEOS satellites*, Proceedings of the Ninth Marcel Grossmann Meeting on General Relativity, World Scientific, pp. 1771–1776
- 2004 **Peron, R.**, *Measurement of relativistic effects in the orbits of LAGEOS and LAGEOS II satellites*, Proceedings of the Third International Workshop on FRONTIER SCIENCE 2004 - PHYSICS AND ASTROPHYSICS IN SPACE (A. Morselli, P. Picozza, and M. Ricci, eds.), Istituto Nazionale di Fisica Nucleare — Laboratori Nazionali di Frascati, Frascati Physics Series **37**, 513-520
- 2005 **Peron, R.**, *Orbital analysis of LAGEOS and LAGEOS II laser ranged satellites: relativistic effects and geophysical issues*, AIP Conference Proceedings 751: General Relativity and Gravitational Physics, pp. 248–250, doi:10.1063/1.1891566
- 2006 **Peron, R.**, *New Results on the Measurement of the Lense-Thirring effect with laser ranged satellites*, Recent Developments in Gravitational Physics: Proceedings of the 15th SIGRAV Conference on General Relativity and Gravitational Physics (I. Ciufolini, E. Cocchia, M. Colpi, V. Gorini, R. Peron, ed.), Institute of Physics Conference Series, Taylor and Francis, p. 435

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- 2004 **Peron, R.**, *Analysis of WEBER-SAT tracking data with the GEODYN II software*, in *Relazione per la Commissione Scientifica Nazionale II INFN*, 2004
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## White books and technical documentation

I contributed in full or in part to the following documentation

- BepiColombo *ISA Experiment Interface Document Part - B*, BC-EST-RS-02520  
*ISA Science Performance Report*, BC-ISA-RP-10001  
*ISA Calibration Plan*, BC-ISA-PL-10003  
*ISA In-Orbit Payload Operations Description (IPOD)*, BC-SGS-TN-007  
*ISA Data Archiving*, BC-ISA-TN-10018  
*ISA Experiment-to-Archive ICD (EAICD)*, BC-ISA-ICD-10001
- MAGIA *MAGIA — Missione Altimetrica Gravimetrica geochimica lunAre, Phase A Report*, MAG-SY-RP-RHI-001
- ODINUS *The ODINUS Mission Concept — The Scientific Case for a Mission to the Ice Giant Planets with Twin Spacecrafts to Unveil the History of our Solar System*
- Uranus *The Science Case for an Orbital Mission to Uranus — Exploring the Origins and Evolution of Ice Giant Planets*

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## Chapters of books

- 2005 **Peron, R.**, Balbi, A., *Introduction*, in *Gravitation: From the Hubble Length to the Planck Length* (I. Ciufolini, E. Coccia, V. Gorini, R. Peron, N. Vittorio, ed.), IOP Publishing
- 2016 **Peron, R.**, *Introduction*, in *Gravity: Where Do We Stand?* (R. Peron, M. Colpi, V. Gorini, U. Moschella, ed.), Springer
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## Didactics

- 2007 **Peron, R.**, *Relatività e geofisica con i satelliti LAGEOS*, lecture for the Experimental Gravitation class of Prof. Fulvio Ricci, Dipartimento di Fisica, Università "La Sapienza"

- 2008 **Peron, R.**, *Relatività e geofisica con i satelliti LAGEOS (e altro ancora)*, lecture for the Experimental Gravitation class of Prof. Massimo Bassan, Dipartimento di Fisica, Università “Tor Vergata”
- 2010-2015 **Peron, R.**, Lectures for the course of Fisica della Gravitazione (Prof. Eugenio Coccia), Dipartimento di Fisica, Università “Tor Vergata”
- 2016- **Peron, R.**, “Gravitational Physics” class (in co-teaching with Alessio Rocchi), Dipartimento di Fisica, Università “Tor Vergata”

### Invited seminars and lectures

- 2005 **Peron, R.**, *Fisica fondamentale nello spazio: i satelliti LAGEOS*, Dipartimento di Fisica, Università “La Sapienza” — Seminari ICRA, December 7, 2005
- 2009 **Peron, R.**, *Gravitomagnetism and other physics with the LAGEOS satellites*, lectures for the SIGRAV Graduate School in Contemporary Relativity and Gravitational Physics, VIII Edition, Gravity: Where do we stand? — Villa Olmo, Como, May 11-15, 2009
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- 2011 **Peron, R.** *Einstein is still right: new tests of gravitation in the field of the Earth*, Università “La Sapienza” — Seminari ICRA, March 3, 2011
- 2013 **Peron, R.**, *Gli esperimenti di radioscienza con BepiColombo e il ruolo dell'accelerometro ISA*, Università dell'Insubria, November 12, 2013
- Peron, R.**, *Verifiche di fisica fondamentale con i satelliti LAGEOS*, Università dell'Insubria, November 13, 2013
- 2014 **Peron, R.**, *Solar System Tests of General Relativity*, DPG Physics School on General Relativity @ 99 — Physikzentrum Bad Honnef, Germany, 18 September 2014
- 2015 **Peron, R.**, *La relatività generale nel sistema solare: fenomenologia e verifiche sperimentali*, Osservatorio Astrofisico di Torino, 23 April 2015
- 2017 **Peron, R.**, *Gravity: Where Do We Stand? (Springer, 2016)* — *Presentazione del libro*, IAPS-INAF, Roma, 25 January 2017

### Outreaching

- 2011 **Peron, R.**, *Fisica fondamentale nello spazio*, Le Scienze **520**, 80-85 (Dicembre 2011)
- 2017 **Peron, R.**, *Gravitazione: la forza che tiene assieme tutte le cose*, lecture in occasion of the 2018 edition of Olimpiadi Italiane di Astronomia, Area della Ricerca Roma 2 Tor Vergata, 17 November 2017

## Talks at conferences

- 2000 **Peron, R.**, *Latest results on the measurement of the Lense-Thirring effect with the LAGEOS satellites*, Ninth Marcel Grossmann Meeting on General Relativity, Roma, 2-8 Luglio 2000; Proceedings of the Ninth Marcel Grossmann Meeting on General Relativity, World Scientific (2002), pp. 1771-1776
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- Peron, R.** and Lucchesi, D.M., *Fundamental physics in space: the LAGEOS satellites*, XVII SIGRAV Conference, Torino, 4-7 Settembre 2006
- Lucchesi, D.M., **Peron, R.**, *LAGEOS satellites pericenter: a tool to constrain a Yukawa interaction in Earth's field*, XCII Congresso Nazionale Società Italiana di Fisica, Torino, 18-23 Settembre 2006
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- Zielinski, J.B., Galazka, R.R., **Peron, R.**, *Possible Detection of the Gravity Field Disturbance with Help of Gradiometer on the Galileo Orbit and Higher*, 1st Colloquium Scientific and Fundamental Aspects of the Galileo Programme, Cité de l'Espace, Toulouse, France, 1-4 Ottobre 2007
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- 2008 Iafolla, V., Fiorenza, E., Lefevre, C., Nozzoli, S., **Peron, R.**, Persichini, M., Reale, A., Santoli, F., *The ISA accelerometer: fundamental support to the BepiColombo mission for the exploration of planet Mercury*, European Geosciences Union, General Assembly 2008, Vienna, Austria, 13-18 Aprile 2008
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- E.C. Lorenzini, I.I. Shapiro, J. Ashenberg, C. Bombardelli, S. Glashow, Iafolla, V., Fiorenza, E., Lefevre, C., V. Milyukov, Nozzoli, S., **Peron, R.**, Persichini, M., Reale, A., Santoli, F., *TEPEE/GReAT (General Relativity Accuracy Test in an Einstein Elevator): experiment development status*, 37th COSPAR Scientific Assembly, Montreal, Canada, 13-20 Luglio 2008
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- 2013 Lucchesi, D.M., **Peron, R.**, *General Relativity Measurements and Constraints in Gravitation theories with Laser-Ranging to the two LAGEOS Satellites*, 20th International Conference on General Relativity and Gravitation and 10th Amaldi Conference on Gravitational Waves, Warsaw, 7-13 July 2013
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- 2014 Iafolla, V., **Peron, R.**, *ISA-S: A seismometer for the Moon*, Russia-ESA Lunar Exploration Cooperation — ESTEC, Noordwijk, Netherlands, 17 February 2014
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- Iafolla, V., **Peron, R.**, Fiorenza, E., Lefevre, C., Lucchesi, D., Lucente, M., Magnafico, C., Nozzoli, S., Santoli, F., *ISA accelerometer and Lunar science*, 40th COSPAR Scientific Assembly — Moscow, Russia, 2-10 August 2014
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2015 Lucchesi, D.M., Anselmo, L., Bassan, M., Pardini, C., **Peron, R.**, Pucacco, G., Visco, M., *Testing gravitation with satellite laser ranging and the LARASE Experiment*, Fourteenth Marcel Grossmann Meeting – MG14 — Roma, 12-18 July 2015

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**Peron, R.**, *Testing General Relativity in the Solar System*, 66th International Astronautical Congress — Jerusalem, Israel, 12-16 October 2015

**Peron, R.**, Lorenzini, E.C., *A dedicated Earth-orbiting spacecraft for investigating fundamental physics and the space environment*, 66th International Astronautical Congress — Jerusalem, Israel, 12-16 October 2015

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- 2016 Visco, M., Lucchesi, D.M., Anselmo, L., Bassan, M., Magnafico, C., Nobili, A.M., Pardini, C., **Peron, R.**, Pucacco, G., Stanga, R., *The LARASE Spin Model of the two LAGEOS and LARES satellites* (poster), European Geosciences Union General Assembly 2016 — Vienna, Austria, 17-22 April 2016, Geophys. Res. Abs. **18**, EGU2016-8304 (2016)
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- Santoli, F., Iafolla, V., Fiorenza, E., Lefevre, C., Lucchesi, D.M., Lucente, M., Magnafico, C., Nozzoli, S, **Peron, R.**, *BepiColombo ISA accelerometer: ready for launch* (PICO presentation), European Geosciences Union General Assembly 2016 — Vienna, Austria, 17-22 April 2016, Geophys. Res. Abs. **18**, EGU2016-15493 (2016)
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- Peron, R.**, Lucchesi, D.M., Santoli, F., Iafolla, V., Fiorenza, E., Lefevre, C., Lucente, M., Magnafico, C., Kalarus, M., Zielinski, J., *POD improvements of GALILEO satellites through the measurement of their non-gravitational accelerations by means of an onboard accelerometer*, European Geosciences Union General Assembly 2016 — Vienna, Austria, 17-22 April 2016, Geophys. Res. Abs. **18**, EGU2016-15970 (2016)
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- Lucchesi, D.M., Anselmo, L., Bassan, M., Magnafico, C., Pardini, C., **Peron, R.**, Pucacco, G., Stanga, R., Visco, M., *The LARASE Spin Model of the two LAGEOS and LARES satellites*, 102° Congresso Nazionale Società Italiana di Fisica, Padova, 26-30 settembre 2016
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- Lucchesi, D.M., Anselmo, L., Bassan, M., Magnafico, C., Pardini, C., **Peron, R.**, Pucacco, G., Stanga, R., Visco, M., *A new general model for the evolution of the Spin vector of the two LAGEOS satellites and LARES and the LARASE research program*, 20<sup>th</sup> International Workshop on Laser Ranging, Potsdam, 9-14 October 2016
- 2017 Pucacco, G., Lucchesi, D.M., Anselmo, L., Bassan, M., Magnafico, C., Pardini, C., **Peron, R.**, Stanga, R., Visco, M., *Earth gravity field modeling and relativistic measurements with laser-ranged satellites and the LARASE research program*, European Geosciences Union General Assembly 2017 — Vienna, Austria, 23-28 April 2017, Geophys. Res. Abs. **19**, EGU2017-13554 (2017)
- Lucchesi, D.M., Anselmo, L., Bassan, M., Magnafico, C., Pardini, C., **Peron, R.**, Pucacco, G., Stanga, R., Visco, M., *Measuring Relativistic effects in the field of the Earth with Laser Ranged Satellites and the LARASE research program* (poster), European Geosciences Union General Assembly 2017 — Vienna, Austria, 23-28 April 2017, Geophys. Res. Abs. **19**, EGU2017-13124 (2017)
- Anselmo, L., Bassan, M., Lucchesi, D.M., Magnafico, C., Pardini, C., **Peron, R.**, Pucacco, G., Stanga, R., and Visco, M., *LARASE: Testing General Relativity with Satellite Laser Ranging*, 52nd Rencontres de Moriond, La Thuile, 25 March - 1 April 2017
- Lucchesi, D.M., Magnafico, C., **Peron, R.**, Visco, M., Anselmo, L., Pardini, C., Bassan, M., Pucacco, G., Stanga, R., *The LARASE research program: state of the art on Modelling and Measurements of General Relativity effects in the field of the Earth*, 4th IEEE International Workshop on Metrology for Aerospace (MetroAeroSpace 2017) — Padova, 21-23 June 2017
- Vespe, F., Rosciano, E., Lucchesi, D.M., **Peron, R.**, Santoli, F., Visco, M., Tartaglia, A., Delle Monache, G., *G4S project: exploitation of eccentric GALILEO satellites for general relativistic investigations*, 4th IEEE International Workshop on Metrology for Aerospace (MetroAeroSpace 2017) — Padova, 21-23 June 2017
- Lucchesi, D.M., Anselmo, L., Bassan, M., Magnafico, C., Pardini, C., Pucacco, G., **Peron, R.**, Stanga, R., and Visco, M., *Relativistic effects measurements in the field of the Earth and the LARASE research program*, 103° Congresso Nazionale della Società Italiana di Fisica, Trento, 11-15 September 2017

Lucchesi, D.M., **Peron, R.**, Santoli, F., Visco, M., Tartaglia, A., Ruggiero, M.L., Vespe, F., Rosciano, E., Delle Monache, G., *The Galileo for Science (G4S) project: testing fundamental physics by the orbit analysis of the Galileo satellites 201 and 202* (poster), 6th International Colloquium on Scientific and Fundamental Aspects of GNSS / Galileo, Valencia, 25-27 October 2017

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## Participation at conferences, workshops, schools, courses

- 2000 Ninth Marcel Grossmann Meeting on General Relativity — Roma, 2000
- 2001 25th Johns Hopkins Workshop — Firenze, September 3-5, 2001
- 2002 SIGRAV School 2002 “From the Hubble length to the Planck length” — Villa Mondragone, Monteporzio Catone (RM), September 6-10, 2002
- 15th SIGRAV Conference — Villa Mondragone, Monteporzio Catone (RM), September 9-12, 2002
- AGU 2002 Fall Meeting — Moscone Center, San Francisco, California, USA, 6-10 December 2002
- 2003 SIGRAV School 2003 — Villa Mondragone, Monteporzio Catone (RM)
- 2004 Second international GOCE User Workshop “GOCE the Geoid and Oceanography” — ESA-ESRIN, Frascati, Italy, 8-10 March 2004
- Third International Conference on Frontier Science “Physics and Astrophysics in Space” — Villa Mondragone, Monteporzio Catone (RM) and INFN Laboratories Frascati (RM), June 14-19, 2004
- 17th International Conference on General Relativity and Gravitation — Dublin, Ireland, 18-23 July 2004
- 16th SIGRAV Conference — Vietri sul Mare (SA), 13-16 September 2004
- 2006 Fundamental Physics in Space with Small Payloads (FPS-06) — INFN LNF, Frascati (RM), 21-23 March, 2006
- XVII SIGRAV Conference — Torino, September 4-7, 2006
- 2nd BepiColombo Calibration Working Group Meeting — Padova, 25 September 2006
- 3rd BepiColombo Science Working Team Meeting — Padova, 26-28 September 2006
- 2007 First MORE Team Meeting, Roma, Alcatel Alenia Space, 26-27 Febbraio 2007
- Observation of the Universe from the Moon — INFN LNF, Frascati (RM), May 7, 2007
- 5th MPO Science Working Group Meeting, ESTEC, 25-26 June 2007
- 2nd MPO Science Operations Working Group Meeting, ESTEC, 27 June 2007
- Encuentros Relativistas Españoles – Spanish Relativity Meeting 2007 — Puerto de La Cruz, Tenerife, 10–14 September, 2007
- XCIII Congresso Nazionale Società Italiana di Fisica — Pisa, 24–29 Settembre 2007
- 9th ILEWG International Conference on Exploration and Utilisation of the Moon (ICEUM9/ILC2007) — Sorrento, 22–26 October, 2007

- 2008 Europa - Jupiter International Science Workshop — Frascati (Rome), Italy, April 21-22, 2008  
 37th COSPAR Scientific Assembly — Montreal, Canada, 13-20 July 2008  
 XCIV Congresso Nazionale Società Italiana di Fisica — Genova, 22-27 Settembre 2008  
 BepiColombo Geodesy and Geophysics working group meeting — Roma, 20-22 Ottobre 2008
- 2009 European Geosciences Union General Assembly 2009 — Vienna, Austria, 19 – 24 April 2009  
 SIGRAV Graduate School in Contemporary Relativity and Gravitational Physics, VIII Edition, Gravity: Where do we stand? — Villa Olmo, Como, May 11-15, 2009
- 2010 Corso *Calcolo scientifico e tecnico in linguaggio Fortran95* — REPLICA, CASPUR, Roma, 12-14 Gennaio 2010  
 8th BepiColombo MPO SWG Meeting, ESTEC, 9-10 March 2010  
 Osservazioni elettromagnetiche e gravimetriche relative al sisma del 6 Aprile 2009 a L'Aquila, Università degli Studi dell'Aquila, 26-28 Aprile 2010  
 International Workshop on Paolo Farinella (1953-2000): the scientist and the man, Università degli Studi di Pisa (Pisa), 14-16 Giugno 2010  
 38th COSPAR Scientific Assembly, Bremen, Germany, 18-25 July 2010  
 XCVI Congresso Nazionale Società Italiana di Fisica — Bologna, 20-24 Settembre 2010  
 XIX SIGRAV Conference on General Relativity and Gravitational Physics — Scuola Normale Superiore, Pisa, Virgo — EGO, Cascina (Pi), September 27 – October 1 2010
- 2011 X Congresso Nazionale di Scienze Planetarie — Bormio (SO), 17-21 Gennaio 2011  
 European Geosciences Union General Assembly 2011 — Vienna, Austria, 03 – 08 April 2011  
 12th Italian-Korean Symposium on Relativistic Astrophysics — ICRANet, Pescara, July 4-8, 2011  
 EPSC-DPS Joint Meeting 2011, 02-07 October 2011, Nantes, France  
 7th BepiColombo MPO SOWG Meeting, ESAC, 14-15 November 2011
- 2012 Thirteenth Marcel Grossmann Meeting on General Relativity — Stockholm, 1–7 July 2012  
 Satellite Methods of Positioning in Modern Geodesy and Navigation — Warsaw, 13–15 September 2012  
 9th BepiColombo Science Working Team Meeting — Stockholm, 18–20 September 2012  
 8th BepiColombo MPO Data Handling and Archiving Working Group Meeting — ESAC, 21-22 November 2012
- 2013 2nd BepiColombo Data Handling and Archiving Working Group Meeting — ESTEC, 5 March 2013

- 10th BepiColombo Science Working Group Meeting — ESTEC, 6 March 2013
- 9th BepiColombo Science Operations Working Group Meeting — ESTEC, 7 March 2013
- Workshop Future missioni ESA (classe L) — ASI, 17-18 aprile
- 20th International Conference on General Relativity and Gravitation and 10th Amaldi Conference on Gravitational Waves — Warsaw, 7–13 July 2013
- European Planetary Science Congress 2013 — London, 08–13 September 2013
- 12th LNF Mini-workshop series: INFN-Space/3 — INFN - Laboratori Nazionali di Frascati, Frascati, 18-19 September 2013
- 2014 Russia-ESA Lunar Exploration Cooperation — ESTEC, Noordwijk, Netherlands, 17 February 2014
- IEEE International Workshop on Metrology for Aerospace (MetroAeroSpace 2014) — Benevento, 29-30 May 2014
- 40th COSPAR Scientific Assembly — Moscow, Russia, 2-10 August 2014
- DPG Physics School on General Relativity @ 99 — Physikzentrum Bad Honnef, Germany, 14-19 September 2014
- 65th International Astronautical Congress — Toronto, Canada, 29 September – 3 October 2014
- Multiple Messengers and Challenges in Astroparticle Physics — GSSI, L'Aquila, 6-17 ottobre 2014
- 2015 4th BepiColombo Data Handling and Archiving Working Group Meeting — ESTEC, 27 January 2015
- 9th BepiColombo Science Operations Working Group Meeting — ESTEC, 28 January 2015
- BepiColombo Calibration Working Group Meeting — ESTEC, 29 January 2015
- 2nd IEEE International Workshop on Metrology for Aerospace (MetroAeroSpace 2015) — Benevento, 3-5 June 2015
- Fourteenth Marcel Grossmann Meeting – MG14 — Roma, 12-18 July 2015
- BepiColombo Science Working Team Meeting 12 — Chicheley Hall, 8-10 September 2015
- 66th International Astronautical Congress — Jerusalem, Israel, 12-16 October 2015
- 2015 ILRS Technical Workshop – Network Performance and Future Expectations for ILRS Support of GNSS, Time Transfer and Space Debris Tracking International Astronautical Congress — Matera, 26-30 October 2015
- 2016 European Geosciences Union General Assembly 2016 — Vienna, Austria, 17-22 April 2016
- 3rd IEEE International Workshop on Metrology for Aerospace (MetroAeroSpace 2016) — Firenze, 22-23 June 2016
- 21st International Conference on General Relativity and Gravitation — New York, 10-15 July 2016

2017 Satellite Geodetic Positioning for Geosciences — Accademia Nazionale dei Lincei, Roma, 08 marzo 2017

2017 ILRS Technical Workshop “Improving ILRS Performance to Meet Future GGOS Requirements” — University of Latvia, Riga, 2-5 October 2017