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Elias Roussos

Career Summary

I am a senior researcher engaged in a broad range of interdisciplinary investigations relevant to magnetospheric, planetary sciences and heliophysics. Since 2005, I have authored or co-authored more than 150 studies, reviews or book chapters on planetary radiation belts, moon-plasma interactions, planetary rings, solar energetic particles and galactic cosmic rays. My work has been published in many leading journals, including Science and Nature and has received over 3000 citations. I gained rich experience with several Cassini and Galileo data sets, I am a Co-I on several experiments on ESA's JUICE and NASA's Europa Clipper mission, and have ongoing collaborations with many scientists internationally. Since 2010 I am also becoming increasingly active in the fields of instrumentation and mission planning. I am the recipient of two prestigious scientific awards by the Max Planck Society and the European Geophysical Union. In terms of service to the field, I am an editor for Annales Geophysicae since 2013, I have been a supervisor or co-supervisor of 10 PhD or graduate students since 2009, I am regular reviewer for journal articles or for research proposals and a recipient of an "Excellence in Refereeing" award by Geophysical Research Letters. My goal is to continue to make innovative interdisciplinary contributions to space science, to actively develop and seek new collaborations, instrument, observation and mission opportunities and to engage the new generation of scientists into the field of space and planetary physics.

Education

2005–2008 **PhD in Space Plasma Physics**, *Technical University of Braunschweig*, Germany.

2003–2004 **MSc in Space Studies**, *International Space University*, France.

1998–2003 **BSc in Physics and Astronomy**, *University of Athens*, Greece.

Academic/Research positions

2009–today **Max Planck Institute for Solar System Research**, *Germany*, Senior Scientist.

2005–2008 **Max Planck Institute for Solar System Research and TU Braunschweig**, *Germany*, PhD research (Dissertation:*Interactions of weakly or non-magnetized bodies with solar system plasmas: Mars and the moons of Saturn*).

2004 **ESA/ESTEC (colab. with ISU, France)**, *Netherlands*, MSc research.

2003 **Univ. of Athens, Physics Department**, *Greece*, Undergraduate research.

Honors and Awards

2012 **Editors' Citation for Excellence in Refereeing - Geophysical Research Letters**.

2011 **EGU Outstanding Young Scientist, Planetary and Solar System Sciences**.

2009 **Max Planck Society's Otto-Hahn Medal for outstanding PhD research**.

2003 **ESA and SES-Global Scholarship for MSc studies**.

Research skills

Data Science:	**IDL (advanced), Python/Matlab (fair), multi-instrument datasets ([37, 112]).**
Simulations:	**User of MHD/hybrid models (e.g.[132]), developer of simulation tools ([110]).**
Space Instruments:	**GEANT4/GRAS (e.g. [118]), SPENVIS, SIMION, SRIM, Instrument Science Operations, In-flight calibration, NAIF/SPICE.**
Mission design:	**White papers for future missions to the Outer Planets, Moon, Heliosphere (e.g. [109]), submissions to ESA's Open Space Innovation Platform.**

Refereed publication and presentation statistics (2005–today)

Publications:	156 (5 book chapters, 151 articles, 9 in Nature/Science, 27 lead author)
Citations:	3031, H-index: 31 (source NASA/ADS)
Presentations:	>100 oral or poster contributions, 16 invited

Areas of Research and number of lead author publications

Outer planet radiation belts, *18.*

Moon and ring-magnetosphere interactions, *11.*

Dynamics of outer planet magnetospheres (excluding radiation belts), *5.*

Energetic particles in the heliosphere, *3.*

Energetic particle detector response simulations, in-flight calibration, *2.*

Mars-Solar wind interaction, *1.*

Future space missions, *1.*

* *Certain papers are relevant for more than one area of research*

Research highlights

1 Discovery of a very high energy oxygen source in Jupiter's radiation belts [111]

2 Detection and characterization of a proton radiation belt inward of Saturn's rings [118]

3 Discovery and origin of transient radiation belts at Saturn [122, 114]

4 A ring-generated, micro-radiation belt of MeV electrons at Saturn [119]

5 Solar cycle variability of planetary radiation belts [129, 55]

6 Drift-resonant relativistic electron acceleration at Jupiter and Saturn [120, 37]

7 Exploring Jupiter's magnetosphere and radiation belts: future perspectives [109]

Project Involvement, Major Collaborations

2021 – today	**ESA TRAPPED project, environment model for Saturn (led by ONERA).**
2021 – today	**COMPASS Jupiter Radiation Belt mission study (led by JHUAPL).**
2021 – today	**ESA Space Plasma instrument definition, EL3 Lunar Lander.**
2019 – 2021	**ESA Space Plasma instrument definition, Gateway Space Station.**
2015 – today	**Co-I on Plasma Instr. for Magnetic Sounding (PIMS), Europa Clipper.**
2013 – today	**Co-I on Plasma Environment Package (PEP) (JUICE mission).**
2013 – today	**Co-I on J-MAG (JUICE mission).**
2013 – 2016	**JUICE Charging Analysis Tool, ESA project.**
2005 – 2019	**Research scientist, Cassini Magnetospheric Imaging Instrument (MIMI).**
2005 – 2008	**Research scientist, Mars Express ASPERA-3 instrument.**

Publications List (Lead author publications: 37, 53, 108-132)

Note 1: Lead authorship in publications 37, 53, 118 is shared

[1] M. Andriopoulou, E. Roussos, N. Krupp, C. Paranicas, M. Thomsen, S. Krimigis, M. K. Dougherty, and K. H. Glassmeier. A noon-to-midnight electric field and nightside dynamics in Saturn's inner magnetosphere, using microsignature observations. *Icarus*, 220(2):503–513, Aug. 2012.

[2] M. Andriopoulou, E. Roussos, N. Krupp, C. Paranicas, M. Thomsen, S. Krimigis, M. K. Dougherty, and K. H. Glassmeier. Spatial and temporal dependence of the convective electric field in Saturn's inner magnetosphere. *Icarus*, 229:57–70, Feb. 2014.

[3] C. S. Arridge, N. Achilleos, J. Agarwal, C. B. Agnor, R. Ambrosi, N. André, S. V. Badman, K. Baines, D. Banfield, M. Barthélémy, M. M. Bisi, J. Blum, T. Bocanegra-Bahamon, B. Bonfond, C. Bracken, P. Brandt, C. Briand, C. Briois, S. Brooks, J. Castillo-Rogez, T. Cavalié, B. Christophe, A. J. Coates, G. Collinson, J. F. Cooper, M. Costa-Sitja, R. Courtin, I. A. Daglis, I. de Pater, M. Desai, D. Dirkx, M. K. Dougherty, R. W. Ebert, G. Filacchione, L. N. Fletcher, J. Fortney, I. Gerth, D. Grassi, D. Grodent, E. Grün, J. Gustin, M. Hedman, R. Helled, P. Henri, S. Hess, J. K. Hillier, M. H. Hofstadter, R. Holme, M. Horanyi, G. Hospodarsky, S. Hsu, P. Irwin, C. M. Jackman, O. Karatekin, S. Kempf, E. Khalisi, K. Konstantinidis, H. Krüger, W. S. Kurth, C. Labrianidis, V. Lainey, L. L. Lamy, M. Laneuville, D. Lucchesi, A. Luntzer, J. MacArthur, A. Maier, A. Masters, S. McKenna-Lawlor, H. Melin, A. Milillo, G. Moragas-Klostermeyer, A. Morschhauser, J. I. Moses, O. Mousis, N. Nettelmann, F. M. Neubauer, T. Nordheim, B. Noyelles, G. S. Orton, M. Owens, R. Peron, C. Plainaki, F. Postberg, N. Rambaux, K. Retherford, S. Reynaud, E. Roussos, C. T. Russell, A. M. Rymer, R. Sallantin, A. Sánchez-Lavega, O. Santolik, J. Saur, K. M. Sayanagi, P. Schenk, J. Schubert, N. Sergis, E. C. Sittler, A. Smith, F. Spahn, R. Srama, T. Stallard, V. Sterken, Z. Sternovsky, M. Tiscareno, G. Tobie, F. Tosi, M. Trieloff, D. Turrini, E. P. Turtle, S. Vinatier, R. Wilson, and P. Zarka. The science case for an orbital mission to Uranus: Exploring the origins and evolution of ice giant planets. *Planet. Space Sci.*, 104:122–140, Dec. 2014.

[4] C. S. Arridge, C. B. Agnor, N. André, K. H. Baines, L. N. Fletcher, D. Gautier, M. D. Hofstadter, G. H. Jones, L. Lamy, Y. Langevin, O. Mousis, N. Nettelmann, C. T. Russell, T. Stallard, M. S. Tiscareno, G. Tobie, A. Bacon, C. Chaloner, M. Guest, S. Kemble, L. Peacocke, N. Achilleos, T. P. Andert, D. Banfield, S. Barabash, M. Barthelemy, C. Bertucci, P. Brandt, B. Cecconi, S. Chakrabarti, A. F. Cheng, U. Christensen, A. Christou, A. J. Coates, G. Collinson, J. F. Cooper, R. Courtin, M. K. Dougherty, R. W. Ebert, M. Entradas, A. N. Fazakerley, J. J. Fortney, M. Galand, J. Gustin, M. Hedman, R. Helled, P. Henri, S. Hess, R. Holme, Ö. Karatekin, N. Krupp, J. Leisner, J. Martin-Torres, A. Masters, H. Melin, S. Miller, I. Müller-Wodarg, B. Noyelles, C. Paranicas, I. de Pater, M. Pätzold, R. Prangé, E. Quémerais, E. Roussos, A. M. Rymer, A. Sánchez-Lavega, J. Saur, K. M. Sayanagi, P. Schenk, G. Schubert, N. Sergis, F. Sohl, E. C. Sittler, N. A. Teanby, S. Tellmann, E. P. Turtle, S. Vinatier, J.-E. Wahlund, and P. Zarka. Uranus Pathfinder: exploring the origins and evolution of Ice Giant planets. *Experimental Astronomy*, 33(2-3):753–791, Apr. 2012.

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[6] C. S. Arridge, J. M. Jasinski, N. Achilleos, Y. V. Bogdanova, E. J. Bunce, S. W. H. Cowley, A. N. Fazakerley, K. K. Khurana, L. Lamy, J. S. Leisner, E. Roussos, C. T. Russell, P. Zarka, A. J. Coates, M. K. Dougherty, G. H. Jones, S. M. Krimigis, and N. Krupp. Cassini observations of Saturn's southern polar cusp. *Journal of Geophysical Research (Space Physics)*, 121(4):3006–3030, Apr. 2016.

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[8] A. Blöcker, E. A. Kronberg, E. E. Grigorenko, E. Roussos, and G. Clark. Dipolarization Fronts in the Jovian Magnetotail: Statistical Survey of Ion Intensity Variations Using Juno Observations. *Journal of Geophysical Research (Space Physics)*, 128(4):e2023JA031312, Apr. 2023.

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[12] J. F. Carbary, D. G. Mitchell, P. Kollmann, N. Krupp, and E. Roussos. Energetic Electron Periodicities During the Cassini Grand Finale. *Journal of Geophysical Research (Space Physics)*, 122(12):12,229–12,235, Dec. 2017.

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