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Mirko Magarotto

Nationality [redacted] ([redacted] **Date of birth:** [redacted] **Gender:** [redacted]

Email address: [redacted]

Address: [redacted]

WORK EXPERIENCE

Assegno di ricerca (Post-Doc Research Fellow)
University of Padova [31/12/2021 – Current]

City: Padova
Country: Italy

Analysis, design and characterization of systems based on plasma mixtures for the telecommunication and the space propulsion fields in the frame of the project Uni - Impresa 2019 - PlasMix4Space

Supervisor: Prof. Daniele Pavarin

Borsa di ricerca (Research Scholarship)
University of Padova [30/09/2021 – 30/12/2021]

City: Padova
Country: Italy

Optimization of the performance of a Helicon plasma thruster via the design of the magnetic field geometry

Supervisor: Dr. Francesco Barato

Assegno di ricerca (Post-Doc Research Fellow)
University of Padova [30/09/2020 – 29/09/2021]

City: Padova
Country: Italy

Analysis, design and characterization of systems based on plasma mixtures for the telecommunication and the space propulsion fields in the frame of the project Uni - Impresa 2019 - PlasMix4Space

Supervisor: Prof. Daniele Pavarin

Assegno di ricerca (Post-Doc Research Fellow)
University of Padova [30/09/2018 – 29/09/2020]

City: Padova
Country: Italy

Numerical and experimental characterization of plasma sources for plasma antennas applications, in the frame of the project "Antenna al plasma – Tecnologia abilitante per SATCOM" financed by the Italian Space Agency (ASI)

Supervisor: Prof. Daniele Pavarin

Consultant Engineer
Technology for Propulsion and Innovation SpA [30/09/2018 – Current]

City: Padova
Country: Italy

Supervising the development of numerical models for the simulation of plasma dynamics and electromagnetic wave propagation in electric plasma thrusters

Visiting Post-Doc Research Fellow
Aristoteles University of Thessaloniki [09/2020 – 09/2021]

City: Thessaloniki
Country: Greece

Four cumulative months in the frame of the PATH project on plasma antennas

Visiting Post-Doc Rersearch Fellow
University of Shanghai [06/2019 – 12/2019]

City: Shanghai
Country: China

One cumulative month in the frame of the PATH project on plasma antennas

Visiting Post-Doc Research Fellow
Mars Space Ltd [09/2018 – 02/2020]

City: Southampton
Country: United Kingdom

Four cumulative months in the frame of the PATH project on plasma antennas

Visiting PhD Student
Mars Space Ltd [07/2017 – 09/2018]

City: Southampton
Country: United Kingdom

Three cumulative months the frame of the PATH project on plasma antennas

Teaching support activity
University of Padova [09/2015 – Current]

City: Padova
Country: Italy

Teaching support activity for the courses of “Costruzioni e Strutture Aerospaziali 1” – 151 hours
2015-16 hours 25, Prof. Ugo Galvanetto
2016-17 hours 24, Prof. Ugo Galvanetto
2017-18 hours 24, Prof. Ugo Galvanetto
2018-19 hours 24, Prof. Ugo Galvanetto
2020-21 hours 24, Prof. Ugo Galvanetto
2021-22 hours 30, Prof. Ugo Galvanetto

Teaching support activity
University of Padova [09/2016 – Current]

City: Padova
Country: Italy

Teaching support activity for the courses of “Aerospace Structures 2” – 84 hours
2016-17 hours 16, Prof. Ugo Galvanetto
2017-18 hours 16, Prof. Ugo Galvanetto
2018-19 hours 16, Prof. Ugo Galvanetto
2020-21 hours 16, Prof. Ugo Galvanetto
2021-22 hours 20, Prof. Mirco Zaccariotto

Teching support activity
University of Padova [09/2018 – Current]

City: Padova
Country: Italy

Teaching support activity for the courses of "Laboratorio di Propulsione Aerospaziale" – 30 hours
2017-18 hours 10, Prof. Daniele Pavarin
2018-19 hours 10, Prof. Daniele Pavarin
2020-21 hours 10, Prof. Daniele Pavarin

Summer school (PATH project)
Technical University of Crete [08/2021]

City: Chania
Country: Greece

Lecturer at the Summer School organized in the frame of the PATH project on plasma antennas

Summer school (PATH project)
University of Shanghai [06/2019]

City: Shanghai
Country: China

Lecturer at the Summer School organized in the frame of the PATH project on plasma antennas

Summer school (PATH project)
University of Padova [06/2018]

City: Padova
Country: Italy

Lecturer at the Summer School organized in the frame of the PATH project on plasma antennas

Summer school (PATH project)
University of Southampton [07/2017]

City: Southampton
Country: United Kingdom

Lecturer at the Summer School organized in the frame of the PATH project on plasma antennas

EDUCATION AND TRAINING

Philosophiae Doctor (PhD)
University of Padova [30/09/2015 – 29/09/2018]

Address: Via VIII Febbraio 2, 35122 Padova (Italy)
Field(s) of study: Sciences, Technologies and Measurements for Space
Thesis: Numerical and experimental investigation into the performance of plasma sources for space propulsion systems

Design and development of a high power Helicon plasma source for space applications. 3D-VIRTUS, a 3D code to analyse self-consistently the plasma transport and the electromagnetic wave propagation in plasma sources, has been developed. Gained experience in operating: (i) electrostatic probes, (ii) thrust stands, (iii) interferometers, (iv) Vector Network Analyzers (VNA). Taken part into the projects: (i) SAPERE STRONG financed from MIUR aimed at the development of a 1kW Helicon plasma thruster; (ii) PATH H2020-MSCA-RISE-2016 (ID 734629) aimed at the development of high density plasma sources to be employed for increasing the performance of plasma antennas.

Supervisors: Dr. Davide Melazzi, Prof. Daniele Pavarin

Abilitazione alla professione di Ingegnere Industriale (licensed as professional Industrial Engineer)
University of Padova [12/2015]

Address: Via VIII Febbraio, 2, 35122 Padova (Italy)

Laurea Magistrale (Master's Degree)
University of Padova [30/09/2013 – 16/09/2015]

Address: Via VIII Febbraio 2, 35122 Padova (Italy)
Field(s) of study: Aerospace Engineering
Final grade : 110/110 cum Laude
Thesis: Numerical Investigation into the Power Deposition and Transport Phenomena in Helicon Plasma Sources

Development of a self-consistent numerical tool for the study of Helicon plasma sources. Coupling of an Electro-Magnetic solver with a 0D and a 1D-radial fluid model of the plasma transport

Supervisors: Prof. Daniele Pavarin, Dr. Davide Melazzi, Dr. Marco Manente

Laurea (Bachelor Degree)
University of Padova [30/09/2010 – 21/07/2013]

Address: Via VIII Febbraio 2, 35122 Padova (Italy)
Field(s) of study: Aerospace Engineering
Final grade : 110/110 cum Laude

Summer school (PATH project)
Technical University of Crete, Chania, GR [08/2021]

Summer School organized in the frame of the PATH project on Plasma Antennas

Summer school (PATH project)
University of Shanghai, Shanghai, CN [06/2019]

Summer School organized in the frame of the PATH project on Plasma Antennas

Summer school (PATH project)
University of Padova, Padova, IT [06/2018]

Summer School organized in the frame of the PATH project on Plasma Antennas

Summer school (PATH project)
University of Southampton, Southampton, UK [07/2017]

Summer School organized in the frame of the PATH project on Plasma Antennas

PUBLICATION METRICS

H index
[07/2022]
Scopus 12
Google scholar 12

Citations
[07/2022]
Scopus 294
Google scholar 407

PUBLICATIONS

Numerical suite for cathodeless plasma thrusters
[2022]
https://doi.org/10.1016/j.actaastro.2022.05.018

M. Magarotto, S. Di Fede, N. Souhair, S. Andrews, F. Ponti, "Numerical suite for cathodeless plasma thrusters", Acta Astronautica 197 (2022): 126-138, ISSN 0094-5765.

Contribution: **first author**, **corresponding author**

Supervision of the codes development, simulation of the plasma transport and electromagnetic wave propagation, physical analysis, writing

PhD supervisor not in the list of authors

Journal Paper

Fully kinetic model of plasma expansion in a magnetic nozzle

[2022]
https://doi.org/10.1088/1361-6595/ac56ec

S. Andrews, S. Di Fede, **M. Magarotto**, "Fully kinetic model of plasma expansion in a magnetic nozzle", Plasma Sources Science and Technology 31.3 (2022): 035022, ISSN 0963-0252

Contribution: **last author**

Supervision of the code development, physical analysis, writing

PhD supervisor not in the list of authors

Journal paper

Design of a Hybrid Metal-Plasma Transmit-Array with Beam-Scanning Capabilities

[2022]
https://doi.org/10.1109/TPS.2022.3149473

G. Mansutti, P. De Carlo, **M. Magarotto**, M. A. Hannan, P. Rocca, A.-D. Capobianco, D. Pavarin, A. Tuozzi, "Design of a Hybrid Metal-Plasma Transmit-Array with Beam-Scanning Capabilities", IEEE Transactions on Plasma Science 50.3 (2022): 662-669, ISSN 0093-3813

Contribution:

Plasma measures, antenna simulation, writing

Journal paper

Semi-analytical Model of a Helicon Plasma Thruster

[2022]
https://doi.org/10.1109/TPS.2022.3146088

M. Guaita, **M. Magarotto**, M. Manente, D. Pavarin, M. Lavagna, "Semi-analytical Model of a Helicon Plasma Thruster", IEEE Transactions on Plasma Science 50.2 (2022): 425-438, ISSN 0093-3813

Contribution: **second author**

Supervision of the code development, physical analysis, writing

Journal paper

Design and In-orbit Demonstration of REGULUS, an Iodine electric propulsion system

[2022]
https://doi.org/10.1007/s12567-021-00374-4

N. Bellomo, **M. Magarotto**, M. Manente, F. Trezzolani, R. Mantellato, L. Cappellini, D. Paulon, A. Selmo, D. Scalzi, M. Minute, M. Duzzi, A. Barbato, A. Schiavon, S. Di Fede, N. Souhair, P. De Carlo, F. Barato, F. Milza, E. Toson, D. Pavarin, "Design and In-orbit Demonstration of REGULUS, an Iodine electric propulsion system", CEAS Space J 14.1 (2022): 79-90, ISSN 1868-2502

Contribution: **corresponding author, second author**

Design of the thruster via simulations of the plasma dynamics and electromagnetic wave propagation, development of the electronic boards (Power Processing Unit) needed to ignite and sustain plasma via numerical simulations, writing

Journal paper

Simulation of the plume of a Magnetically Enhanced Plasma Thruster with SPIS

[2021]
https://doi.org/10.1017/S0022377821001057

S. Di Fede, **M. Magarotto**, S. Andrews, D. Pavarin, "Simulation of the plume of a Magnetically Enhanced Plasma Thruster with SPIS", Journal of Plasma Physics 87.6 (2021): 905870611, ISSN 0022-3778

Contribution: **second author**

Supervision of the code development, physical analysis, writing

Journal paper

Analysis of the plasma transport in numerical simulations of helicon plasma thrusters

[2021]
https://doi.org/10.1063/5.0066221

N. Souhair, **M. Magarotto**, F. Ponti, D. Pavarin, "Analysis of the plasma transport in numerical simulations of helicon plasma thrusters", AIP Advances 11.11 (2021): 115016, ISSN 2158-3226

Contribution: **second author**

Supervision of the code development, physical analysis, writing

Journal paper

Development of a lumping methodology for the analysis of the excited states in plasma discharges operated with argon, neon, krypton, and xenon

[2021]
https://doi.org/10.1063/5.0057494

N. Souhair, **M. Magarotto**, E. Majorana, F. Ponti, D. Pavarin, "Development of a lumping methodology for the analysis of the excited states in plasma discharges operated with argon, neon, krypton, and xenon", Physics of Plasmas 28.9 (2021): 093504, ISSN 1070-664X

Contribution: **second author**

Supervision of the code development, physical analysis, writing

Journal paper

Experimental Characterization of a Plasma Dipole in the UHF band

[2021]
https://doi.org/10.1109/LAWP.2021.3091739

P. De Carlo, **M. Magarotto**, G. Mansutti, S. Boscolo, A.-D. Capobianco, D. Pavarin, "Experimental Characterization of a Plasma Dipole in the UHF band", IEEE Antennas and Wireless Propagation Letters 20.9 (2021): 1621-1625, ISSN 1536-1225

Contribution: **corresponding author, second author**

Plasma source development and measures, antenna development and measures, writing

Journal paper

Numerical Suite for Gaseous Plasma Antennas Simulation

[2021]
https://doi.org/10.1109/TPS.2020.3040008

M. Magarotto, P. De Carlo, G. Mansutti, F. J. Bosi, N. E. Buris, A.-D. Capobianco, D. Pavarin, "Numerical Suite for Gaseous Plasma Antennas Simulation", IEEE Transactions on Plasma Science 49.1 (2021): 285-297, ISSN 0093-3813

Contribution: **first author, corresponding author**

Development of the code to simulate the plasma transport in a plasma source, antenna simulations, plasma measures, writing

Journal paper

Feasibility study of a novel class of plasma antennas for SatCom navigation systems

[2021]
https://doi.org/10.1016/j.actaastro.2020.10.015

P. de Carlo, **M. Magarotto**, G. Mansutti, A. Selmo, A.-D. Capobianco, D. Pavarin, "Feasibility study of a novel class of plasma antennas for SatCom navigation systems", Acta Astronautica 178 (2021): 846-853, ISSN 0094-5765

Contribution: **corresponding author, second author**

Plasma source development and measures, antenna simulations, writing

Journal paper

Characterisation of a thermionic plasma source apparatus for high-density gaseous plasma antenna applications

[2020]
https://doi.org/10.1088/1361-6595/abb21a

A. Daykin-Iliopoulos, F. J. Bosi, F. Coccaro, **M. Magarotto**, A. Papadimopoulos, P. De Carlo, C. Dobranszki, I. O. Golosnoy, S. Gabriel, "Characterisation of a thermionic plasma source apparatus for high-density gaseous plasma antenna applications", Plasma Sources Science and Technology 29.11 (2020): 115002, ISSN 0963-0252

Contribution:

Antenna simulation, literature review, writing

PhD supervisor not in the list of authors

Journal paper

Parametric Study of a Cathode-Less Radio Frequency Thruster

[2020]
https://doi.org/10.1109/TPS.2020.3006257

M. Magarotto, D. Pavarin, "Parametric Study of a Cathode-Less Radio Frequency Thruster," IEEE Transactions on Plasma Science 48.8 (2020): 2723-2735, ISSN 0093-3813

Contribution: **first author**, **corresponding author**

Development of the code to simulate plasma transport and electromagnetic wave propagation in a plasma source, simulations, writing

Journal paper

Numerical Model of a Helicon Plasma Thruster

[2020]
https://doi.org/10.1109/TPS.2020.2982541

M. Magarotto, M. Manente, F. Trezzolani, D. Pavarin, "Numerical Model of a Helicon Plasma Thruster." IEEE Transactions on Plasma Science 48.4 (2020): 835-844, ISSN 0093-3813

Contribution: **first author**, **corresponding author**

Development of the code to simulate plasma transport and electromagnetic wave propagation in a plasma source, simulations, measures, writing

Journal paper

Modeling and design of a plasma-based transmit-array with beam scanning capabilities

[2020]
https://doi.org/10.1016/j.rinp.2019.102923

G. Mansutti, P. De Carlo, M. A. Hannan, F. Boulos, P. Rocca, A.-D. Capobianco, **M. Magarotto**, A. Tuozzi, "Modeling and design of a plasma-based transmit-array with beam scanning capabilities." Results in Physics 16 (2020): 102923, ISSN 2211-3797

Contribution:

Plasma source development, literature review, writing

PhD supervisor not in the list of authors

Journal paper

Comparative performance assessment of plasma reactors for the treatment of PFOA; reactor design, kinetics, mineralization and energy yield

[2020]
https://doi.org/10.1016/j.cej.2019.123031

M. Saleem, O. Biondo, G. B. Sretenovic, G. Tomei, **M. Magarotto**, D. Pavarin, E. Marotta, C. Paradisi, "Comparative performance assessment of plasma reactors for the treatment of PFOA; reactor design, kinetics, mineralization and energy yield." Chemical Engineering Journal 382 (2020): 123031, ISSN 1385-8947

Contribution:

Plasma reactor development, literature review, writing

Journal paper

3D-VIRTUS: Equilibrium condition solver of radio-frequency magnetized plasma discharges for space applications

[2020]
https://doi.org/10.1016/j.cpc.2019.106953

M. Magarotto, D. Melazzi, D. Pavarin, "3D-VIRTUS: Equilibrium condition solver of radio-frequency magnetized plasma discharges for space applications." Computer Physics Communications 247 (2020): 106953, ISSN 0010-4655

Contribution: **first author**, **corresponding author**

Development of the code to simulate plasma transport and electromagnetic wave propagation in a plasma source, simulations, writing

Journal paper

Study on the influence of the magnetic field geometry on the power deposition in a helicon plasma source

[2019]
https://doi.org/10.1017/S0022377819000473

M. Magarotto, D. Melazzi, D. Pavarin, "Study on the influence of the magnetic field geometry on the power deposition in a helicon plasma source", Journal of Plasma Physics 85.4 (2019): 905850404, ISSN 0022-3778

Contribution: **first author**, **corresponding author**

Development of the Finite Difference Frequency Domain code to simulate wave propagation in a plasma source, simulations, writing

Journal paper

Enhanced biDimensional pIc: an electrostatic/magnetostatic particle-in-cell code for plasma based systems

[2019]
https://doi.org/10.1017/S0022377819000205

G. Gallina, **M. Magarotto**, M. Manente, D. Pavarin, "Enhanced biDimensional pIc: an electrostatic/magnetostatic particle-in-cell code for plasma based systems", Journal of Plasma Physics 85.2 (2019): 905850205, ISSN 0022-3778

Contribution: **corresponding author, second author**

Simulations, literature review, writing

Journal paper

REGULUS: A propulsion platform to boost small satellite missions

[2019]
https://doi.org/10.1016/j.actaastro.2018.12.022

M. Manente, F. Trezzolani, **M. Magarotto**, E. Fantino, A. Selmo, N. Bellomo, E. Toson, D. Pavarin, "REGULUS: A propulsion platform to boost small satellite missions", Acta Astronautica 157 (2019): 241-249, ISSN 0094-5765

Contribution: **corresponding author**

Design of the thruster via simulations of the plasma dynamics and electromagnetic wave propagation, development of the electronic boards (Power Processing Unit) needed to ignite and sustain plasma via numerical simulations, writing

Journal paper

Development of a counterbalanced pendulum thrust stand for electric propulsion

[2018]
https://doi.org/10.1016/j.measurement.2018.02.011

F. Trezzolani, **M. Magarotto**, M. Manente, D. Pavarin, "Development of a counterbalanced pendulum thrust stand for electric propulsion", Measurement 122 (2018): 494-501, ISSN 0263-2241

Contribution: **corresponding author, second author**

Measures, algorithms, writing

Journal paper

Simulation of a magnetized plasma plume with a 3D fully kinetic PIC approach

[2022]
https://www.researchgate.net/publication/361789140_Simulation_of_a_magnetized_plasma_plume_with_a_3D_fully_kinetic_PIC_approach

S. Di Fede, **M. Magarotto**, D. Pavarin, "Simulation of a magnetized plasma plume with a 3D fully kinetic PIC approach", IEPC-2022-494, 37th International Electric Propulsion Conference (IEPC), Boston MA, USA, 2022

Conference paper

Analysis of different numerical approaches for the simulation of a Helicon Plasma Thruster

[2022]
https://www.researchgate.net/publication/361585984_Analysis_of_different_numerical_approaches_for_the_simulation_of_a_Helicon_Plasma_Thruster

N. Souhair, F. Ponti, **M. Magarotto**, D. Pavarin, "Analysis of different numerical approaches for the simulation of a Helicon Plasma Thruster", IEPC-2022-495, 37th International Electric Propulsion Conference (IEPC), Boston MA, USA, 2022

Conference paper

Simulation and modelling of an iodine fed Helicon Plasma Thruster

[2022]
https://www.researchgate.net/publication/361586075_Simulation_and_modelling_of_an_iodine_fed_Helicon_Plasma_Thruster

N. Souhair, **M. Magarotto**, S. Dalle Fabbriche, R. Andrulli, S. Andrews, F. Ponti, D. Pavarin, "Simulation and modelling of an iodine fed Helicon Plasma Thruster", IEPC-2022-496, 37th International Electric Propulsion Conference (IEPC), Boston MA, USA, 2022

Conference paper

3D Full PIC Simulation of a Magnetized Plasma Plume

[2022]
https://www.researchgate.net/publication/360860281_3D_Full_PIC_Simulation_of_a_Magnetized_Plasma_Plume

S. Di Fede, **M. Magarotto**, D. Pavarin, "3D Full PIC Simulation of a Magnetized Plasma Plume", SP2022-161, 8th Space Propulsion conference, Estoril, PT, 2022

Conference paper

Analysis of Different Numerical Approaches for the Simulation of a Helicon Plasma Thruster

[2022]
https://www.researchgate.net/publication/360577309_ANALYSIS_OF_DIFFERENT_NUMERICAL_APPROACHES_FOR_THE_SIMULATION_OF_A_HELICON_PLASMA_THRUSTER

N. Souhair, **M. Magarotto**, D. Pavarin, F. Ponti, "Analysis of Different Numerical Approaches for the Simulation of a Helicon Plasma Thruster", SP2022-190, 8th Space Propulsion conference, Estoril, PT, 2022

Conference paper

Electric Propulsion for CubeSats: a Review

[2021]
https://www.researchgate.net/publication/356128197_Electric_Propulsion_for_CubeSats_a_Review

M. Magarotto, M. Manente, D. Pavarin, “Electric Propulsion for CubeSats: a Review”, IAC-21,C4,8-B4.5A,1,x64088, 72th International Astronautical Congress (IAC), Dubai, UAE, 2021, ISSN 0074-1795

Conference paper

Numerical Suite for Magnetically Enhanced Plasma Thrusters

[2021]
https://www.researchgate.net/publication/356068323_Numerical_Suite_for_Magnetically_Enhanced_Plasma_Thrusters

M. Magarotto, S. Di Fede, N. Souhair, S. Andrews, M. Manente, F. Ponti, D. Pavarin, "Numerical Suite for Magnetically Enhanced Plasma Thrusters", IAC-21,C4,6,3,x64083, 72th International Astronautical Congress (IAC), Dubai, UAE, 2021, ISSN 0074-1795

Conference paper

Advancements in Plasma Antennas for SatCom Navigation Systems

[2021]
https://www.researchgate.net/publication/356128299_Advancements_in_Plasma_Antennas_for_SatCom_Navigation_Systems

P. De Carlo, **M. Magarotto**, G. Mansutti, A.-D. Capobianco, D. Pavarin, "Advancements in Plasma Antennas for SatCom Navigation Systems", IAC-21,B2,5,1,x64098, 72th International Astronautical Congress (IAC), Dubai, UAE, 2021, ISSN 0074-1795

Conference paper

E-REGULUS: development of a 150 W prototype of magnetically enhanced plasma thruster

[2021]
https://www.researchgate.net/publication/356128299_Advancements_in_Plasma_Antennas_for_SatCom_Navigation_Systems

M. Duzzi, M. Manente, F. Trezzolani, N. Bellomo, A. Barbato, L. Cappellini, M. Minute, R. Mantellato, **M. Magarotto**, D. Paulon, A. Schiavon, D. Scalzi, A. Selmo, E. Toson, F. Milza, L. Bianchi, D. Di Cara, D. Pavarin, "E-REGULUS: development of a 150 W prototype of magnetically enhanced plasma thruster", IAC-21,C4,5,9,x65151, 72th International Astronautical Congress (IAC), Dubai, UAE, 2021, ISSN 0074-1795

Conference paper

A case study of a motorised flexible IOD platform: the UNISAT-7 and REGULUS mission

[2021]
https://www.researchgate.net/publication/356128358_A_case_study_of_a_motorised_flexible_IOD_platform_the_UNISAT-7_and_REGULUS_mission

F. Milza, E. Toson, N. Bellomo, R. Di Roberto, N. Sparvieri, F. Graziani, F. Trezzolani, M. Manente, D. Paulon, A. Barbato, **M. Magarotto**, R. Mantellato, L. Cappellini, A. Selmo, M. Minute, M. Duzzi, D. Pavarin, "A case study of a motorised flexible IOD platform: the UNISAT-7 and REGULUS mission", IAC-21,B4,6A,10,x65905, 72th International Astronautical Congress (IAC), Dubai, UAE, 2021, ISSN 0074-1795

Conference paper

Improvement of a numerical tool for the simulation of a Helicon Plasma Thruster

[2021]
https://www.researchgate.net/publication/350187031_IMPROVEMENT_OF_A_NUMERICAL_TOOL_FOR_THE_SIMULATION_OF_A_HELICON_PLASMA_THRUSTER_ESTORIL

N. Souhair, **M. Magarotto**, M. Manente, D. Pavarin, F. Ponti, "Improvement of a numerical tool for the simulation of a Helicon Plasma Thruster", SP2020_00070, 7th Space Propulsion Conference, SP2020+1, Virtual Conference, 2021

Conference paper

REGULUS: integration and testing of an iodine electric propulsion system

[2021]
https://www.researchgate.net/publication/350187016_REGULUS_INTEGRATION_AND_TESTING_OF_AN_IODINE_ELECTRIC_PROPULSION_SYSTEM

N. Bellomo, **M. Magarotto**, M. Manente, F. Trezzolani, R. Mantellato, L. Cappellini, D. Paulon, A. Selmo, D. Scalzi, M. Minute, M. Duzzi, A. Barbato, A. Schiavon, N. Souhair, S. Di Fede, P. De Carlo, F. Barato, E. Toson, D. Pavarin, "REGULUS: integration and testing of an iodine electric propulsion system", SP2020_00109, 7th Space Propulsion Conference, SP2020+1, Virtual Conference, 2021

Conference paper

Quasi 2D PIC model of a magnetically enhanced plasma thruster

[2021]
https://www.researchgate.net/publication/350187214_QUASI_2D_PIC_MODEL_OF_A_MAGNETICALLY_ENHANCED_PLASMA_THRUSTER

M. Minute, **M. Magarotto**, A. Modesti, G. Moresco, F. Trezzolani, M. Manante, D. Pavarin, "Quasi 2D PIC model of a magnetically enhanced plasma thruster", SP2020_00110, 7th Space Propulsion Conference, SP2020+1, Virtual Conference, 2021

Coference paper

Numerical Simulation of the Plume of a Magnetically Enhanced Plasma Thruster

[2021]
https://www.researchgate.net/publication/350123612_Numerical_Simulation_of_the_Plume_of_a_Magnetically_Enhanced_Plasma_Thruster

S. Di Fede, **M. Magarotto**, S. Andrews, M. Manente D. Pavarin, "Numerical Simulation of the Plume of a Magnatically Enhanced Plasma Thruster", SP2020_00111, 7th Space Propulsion Conference, SP2020+1, Virtual Conference, 2021

Conference paper

Enhancement of microsatellites' mission capabilities: integration of REGULUS electric propulsion module into UniSat-7

[2019]
https://www.researchgate.net/publication/338254305_Enhancement_of_microsatellites'_mission_capabilities_integration_of_REGULUS_electric_propulsion_module_into_UniSat-7

N. Bellomo, M. Manente, F. Trezzolani, A. Gloder, A. Selmo, R. Mantellato, E. Toson, L. Cappellini, M. Duzzi, D. Scalzi, A. Schiavon, A. Barbato, D. Paulon, N. Souhair, **M. Magarotto**, M. Minute, R. Di Roberto, D. Pavarin, F. Grazieni, “Enhancement of microsatellites' mission capabilities: integration of REGULUS electric propulsion module into UniSat-7”, IAC-19,C4,8-B4.5A, 5,x52699, 70th International Astronautical Congress (IAC), Washington, DC, USA, 2019, ISSN 0074-1795

Conference paper

Curl Plasma Antenna for SatCom Navigation Systems

[2019]
https://www.researchgate.net/publication/338254381_Curl_Plasma_Antenna_for_SatCom_Navigation_Systems

P. De Carlo, G. Mansutti, A.-D. Capobianco, D. Pavarin, C. Facchinetti, A. Tuozzi, **M. Magarotto**, “Curl Plasma Antenna for SatCom Navigation Systems”, IAC-19,B2,1,3,x51735, 70th International Astronautical Congress (IAC), Washington, DC, USA, 2019, ISSN 0074-1795

Conference paper

Inductive Plasma Thruster (IPT) design for an Atmosphere-Breathing Electric Propulsion System (ABEP)

[2019]
https://www.researchgate.net/publication/337026802_Inductive_Plasma_Thruster_IPT_design_for_an_Atmosphere-Breathing_Electric_Propulsion_System_ABEP

F. Romano, G. Herdrich, P. C. E. Roberts, ..., **M. Magarotto**, D. Pavarin, “Inductive Plasma Thruster (IPT) design for an Atmosphere-Breathing Electric Propulsion System (ABEP)”, IAC-19,C4,6,3,x49922, 70th International Astronautical Congress (IAC), Washington, DC, USA, 2019, ISSN 0074-1795

Conference paper

Numerical Model of a Magnetically Enhanced Plasma Thruster

[2019]
http://electricrocket.org/2019/415.pdf

M. Magarotto, M. Manente, F. Trezzolani, D. Pavarin, "Numerical Model of a Magnetically Enhanced Plasma Thruster", IEPC-2019-415, 36th International Electric Propulsion Conference (IEPC), Vienna, A, 2019

Conference paper

REGULUS: Iodine Fed Plasma Propulsion System for Small Satellites

[2019]
http://electricrocket.org/2019/417.pdf

M. Manente, F. Trezzolani, R. Mantellato, D. Scalzi, A. Schiavon, N. Souhair, M. Duzzi, L. Cappellini, A. Barbato, D. Paulon, A. Selmo, N. Bellomo, A. Gloder, E. Toson, M. Minute, **M. Magarotto**, D. Pavarin, "REGULUS: Iodine Fed Plasma Propulsion System for Small Satellites", IEPC-2019-417, 36th International Electric Propulsion Conference (IEPC), Vienna, A, 2019

Conference paper

REGULUS: Know-How Acquired on Iodine Propellant

[2019]
http://electricrocket.org/2019/419.pdf

M. Manente, F. Trezzolani, R. Mantellato, D. Scalzi, A. Schiavon, L. Cappellini, F. Barato, N. Bellomo, A. Gloder, and E. Toson, M. Minute, D. Vallisari, **M. Magarotto**, D. Pavarin, "REGULUS: Know-How Acquired on Iodine Propellant", IEPC-2019-419, 36th International Electric Propulsion Conference (IEPC), Vienna, A, 2019

Conference paper

Inductive plasma thruster (IPT) for an atmosphere breathing electric propulsion system: Design and set in operation

[2019]
http://electricrocket.org/2019/488.pdf

F. Romano, G. Herdrich, P. C. E. Roberts, ..., **M. Magarotto**, D. Pavarin, "Inductive plasma thruster (IPT) for an atmosphere breathing electric propulsion system: Design and set in operation", IEPC-2019-A-488, 36th International Electric Propulsion Conference (IEPC), Vienna, A, 2019

Conference paper

Design and Numerical Characterization of a Realistic Plasma Dipole

[2019]
https://10.1109/ICEAA.2019.8879237

P. De Carlo, G. Mansutti, **M. Magarotto**, A. D. Capobianco, D. Pavarin, A. Tuozzi, C. Facchinetti, "Design and Numerical Characterization of a Realistic Plasma Dipole", 21st International Conference on Electromagnetics in Advanced Applications (ICEAA), pp. 811-815, Granada, E, 2019, ISBN 978-1-72-810563-5

Conference paper

Magnetic Enhanced Plasma Propulsion System for small-satellites IOD development

[2018]
https://www.researchgate.net/publication/338254654_Magnetic_Enhanced_Plasma_Propulsion_System_for_small-satellites_IOD_development

M. Manente, F. Trezzolani, N. Bellomo, **M. Magarotto**, E. Toson, R. Mantellato, F. Barato, D. Pavarin, "Magnetic Enhanced Plasma Propulsion System for small-satellites IOD development", IAC-18-F1.2.3, 69th International Astronautical Congress (IAC), Bremen, D, 2018, ISSN 0074-1795

Conference paper

Analysis of electrodeless plasma source enhancement by an externally applied magnetic field for an inductive plasma thruster (IPT)

[2018]
https://www.researchgate.net/publication/331479205_Analysis_of_electrodeless_plasma_source_enhancement_by_an_externally_applied_magnetic_field_for_an_inductive_plasma_thruster_IPT

S. Masillo, F. Romano, ..., **M. Magarotto**, D. Pavarin, "Analysis of electrodeless plasma source enhancement by an externally applied magnetic field for an inductive plasma thruster (IPT)", 7th Russian-German Conference on Electric Propulsion (RGCEP), 2018

Conference paper

Numerical model of the Plasma Source of a Helicon Plasma Thruster

[2018]
https://www.researchgate.net/publication/338254651_Numerical_model_of_the_Plasma_Source_of_a_Helicon_Plasma_Thruster

M. Magarotto, M. Manente, P. de Carlo, F. Trezzolani, D. Pavarin, D. Melazzi, "Numerical model of the Plasma Source of a Helicon Plasma Thruster", SP2018_00424, 6th Space Propulsion Conference, SP2018, Siville, E, 2018

Conference paper

Development of a Miniature Plasma Propulsion Module for Small Satellites

[2018]
https://www.researchgate.net/publication/338254558_DEVELOPMENT_OF_A_MINIATURE_PLASMA_PROPULSION_MODULE_FOR_SMALL_SATELLITES

F. Trezzolani, M. Manente, N. Bellomo, E. Toson, A. Selmo, **M. Magarotto**, P. De Carlo, D. Melazzi, D. Pavarin, "Development of a Miniature Plasma Propulsion Module for Small Satellites", SP2018_00432, 6th Space Propulsion Conference, SP2018, Siville, E, 2018

Conference paper

Study on the Influence of the Magnetic Field Topology on the Power Deposition in a Helicon Plasma Source

[2017]
https://www.researchgate.net/publication/338254669_Study_on_the_Influence_of_the_Magnetic_Field_Topology_on_the_Power_Deposition_in_a_Helicon_Plasma_Source

M. Magarotto, M. Manente, P. de Carlo, F. Trezzolani, D. Pavarin, D. Melazzi, "Study on the Influence of the Magnetic Field Topology on the Power Deposition in a Helicon Plasma Source", IEPC-2017-58, 35th International Electric Propulsion Conference (IEPC), Atlanta GA, USA, 2017

Conference paper

Development and test of a high power RF plasma thruster in project SAPERE-STRONG

[2017]
http://electricrocket.org/IEPC/IEPC_2017_462.pdf

F. Trezzolani, M. Manente, A. Selmo, D. Melazzi, **M. Magarotto**, D. Moretto, P. De Carlo, M. Pessana, D. Pavarin, "Development and test of a high power RF plasma thruster in project SAPERE-STRONG", IEPC-2017-462, 35th International Electric Propulsion Conference (IEPC), Atlanta GA, USA, 2017

Conference paper

Development and testing of a miniature Helicon plasma thruster

[2017]
http://electricrocket.org/IEPC/IEPC_2017_519.pdf

F. Trezzolani, M. Manente, E. Toson, A. Selmo, **M. Magarotto**, D. Moretto, F. Bosi, P. De Carlo, D. Melazzi, D. Pavarin, "Development and testing of a miniature Helicon plasma thruster", IEPC-2017-519, 35th International Electric Propulsion Conference (IEPC), Atlanta GA, USA, 2017

Conference paper

Transport and Acceleration Phenomena in Helicon Plasma Thrusters

[2017]
https://www.researchgate.net/publication/338254675_Numerical_Study_of_Power_Deposition_Transport_and_Acceleration_Phenomena_in_Helicon_Plasma_Thrusters

M. Magarotto, M. Manente, P. de Calro, F. Trezzolani, D. Pavarin, D. Melazzi, "Numerical Study of Power Deposition, Transport and Acceleration Phenomena in Helicon Plasma Thrusters", IEPC-2017-565, 35th International Electric Propulsion Conference (IEPC), Atlanta GA, USA, 2017

Conference paper

Numerical Model of an Helicon Plasma Source for Space Propulsion Application

[2017]
https://www.researchgate.net/publication/338254682_Numerical_Model_of_an_Helicon_Plasma_Source_for_Space_Propulsion_Application

M. Magarotto, F. J. Bosi, P. de Carlo, G. Gallina, M. Manente, F. Trezzolani, D. Pavarin, D. Melazzi, "Numerical Model of an Helicon Plasma Source for Space Propulsion Application", 7th European Conference for Aeronautics and Space Sciences, (EUCASS), Milan, IT, 2017

Conference paper

Development of a counterbalanced pendulum thrust stand for electric propulsion

[2017]
https://10.1109/MetroAeroSpace.2017.7999554

F. Trezzolani, **M. Magarotto**, M. Manente, D. Moretto, F. J. Bosi, G. Gallina, P. de Carlo, D. Melazzi, D. Pavarin, M. Pessana, "Development of a counterbalanced pendulum thrust stand for electric propulsion", 4th IEEE International Workshop on Metrology for AeroSpace (MetroAeroSpace), pp. 152-157., Padova, IT, 2017, ISBN 978-1-50-904234-0

Conference paper

Numerical Investigation into the Power Deposition and Transport Phenomena in Helicon Plasma Sources

[2016]
https://www.researchgate.net/publication/338254593_Numerical_Investigation_into_the_Power_Deposition_and_Transport_Phenomena_in_Helicon_Plasma_Sources

M. Magarotto, F. J. Bosi, P. de Carlo, M. Manente, F. Trezzolani, D. Pavarin, P. Alotto, D. Melazzi, “Numerical Investigation into the Power Deposition and Transport Phenomena in Helicon Plasma Sources”, COMSOL conference, Munich, DE, 2016

Conference paper

Numerical simulation of Vibrationally Active Ar-H2 Microwave Plasma

[2016]
https://www.researchgate.net/publication/338254692_Numerical_simulation_of_Vibrationally_Active_Ar-H2_Microwave_Plasma

F. Bosi, **M. Magarotto**, P. de Carlo, M. Manente, F. Trezzolani, D. Pavarin, D. Melazzi, P. Alotto, R. Bertani, “Numerical simulation of Vibrationally Active Ar-H2 Microwave Plasma”, COMSOL conference, Munich, DE, 2016

Conference paper

Numerical and Experimental Investigation into the Performance of Plasma-Based Thruster for Space Propulsion

[2019]

https://www.researchgate.net/publication/338254774_Numerical_and_Experimental_Investigation_into_the_Performance_of_Plasma-Based_Thuster_for_Space_Propulsion

M. Magarotto, "Numerical and Experimental Investigation into the Performance of Plasma-Based Thruster for Space Propulsion", (2019)

PhD thesis

Numerical Investigation into the Power Deposition and Transport Phenomena in Helicon Plasma Sources

[2015]

https://www.researchgate.net/publication/338254853_NUMERICAL_INVESTIGATION_INTO_THE_POWER_DEPOSITION_AND_TRANSPORT_PHENOMENA_IN_HELICON_PLASMA_SOURCES

M. Magarotto, "Numerical Investigation into the Power Deposition and Transport Phenomena in Helicon Plasma Sources", (2015)

Master thesis

Investigation of Transient Regime Transition in Inductive Plasma Generators

[2019]

R. Georg, A. Chadwick, B. Dally, G. Herdrich, F. Romano, **M. Magarotto**, D. Pavarin, "Investigation of Transient Regime Transition in Inductive Plasma Generators", IEPC-2019-287, 36th International Electric Propulsion Conference (IEPC), Vienna, A, 2019

Poster

Quasi 2D PIC Model of a Magnetically Enhanced Plasma Thruster

[2019]

M. Minute, **M. Magarotto**, I. Bevilacqua, F. Trezzolani, M. manente, D. Pavarin, "Quasi 2D PIC Model of a Magnetically Enhanced Plasma Thruster", IEPC-2019-416, 36th International Electric Propulsion Conference (IEPC), Vienna, A, 2019

Poster

Numerical Study of Power Deposition, Transport and Acceleration Phenomena in Helicon Plasma Thrusters

[2017]

M. Magarotto, M. Manente, P. De Carlo, F. Trezzolani, D. Pavarin, D. Melazzi, "Numerical Study of Power Deposition, Transport and Acceleration Phenomena in Helicon Plasma Thrusters", 35th International Electric Propulsion Conference (IEPC), Atlanta, GA, USA, 2017

Poster

Numerical Study of Power Deposition, Testing and Characterization of Counterbalanced Pendulum Thrust Stand for Electric Propulsion

[2017]

F. Trezzolani, **M. Magarotto**, M. Manente, D. Moretto, P. De Carlo, D. Melazzi, M. Pessana, D. Pavarin, "Numerical Study of Power Deposition, Testing and Characterization of Counterbalanced Pendulum Thrust Stand for Electric Propulsion", 35th International Electric Propulsion Conference (IEPC), Atlanta GA, USA, 2017

Poster

CONFERENCES AND SEMINARS

37th International Electric Propulsion Conference (IEPC)

[Boston MA, USA, 19/06/2022 – 23/06/2022]

Session chair

- "Simulation of a magnetized plasma plume with a 3D fully kinetic PIC approach", IEPC-2022-494, **Presenting author**
- "Analysis of different numerical approaches for the simulation of a Helicon Plasma Thruster", IEPC-2022-495
- "Simulation and modelling of an iodine fed Helicon Plasma Thruster", IEPC-2022-496

72nd International Astronautical Congress (IAC)

[Dubai, UAE, 24/10/2021 – 28/10/2021]

Keynote speech

- **Keynote**: "Electric Propulsion for CubeSats: a Review", IAC-21,C4,8-B4.5A,1,x64088, **Presenting author**
- "Numerical Suite for Magnetically Enhanced Plasma Thrusters", IAC-21,C4,6,3,x64083
- "Advancements in Plasma Antennas for SatCom Navigation Systems", IAC-21,B2,5,1,x64098, **Presenting author**
- "E-REGULUS: development of a 150 W prototype of magnetically enhanced plasma thruster", IAC-21,C4,5,9,x65151, **Presenting author**
- "A case study of a motorised flexible IOD platform: the UNISAT-7 and REGULUS mission", IAC-21,B4,6A,10,x65905, **Presenting author**

Summer student contest in the frame of the 37th International Electric Propulsion Conference (IEPC)

[On-line event, 05/2021 – 07/2021]

Organizer

7th Space Propulsion Conference

[On-line conference, 16/03/2021 – 18/03/2021]

- "Improvement of a numerical tool for the simulation of a Helicon Plasma Thruster", SP2020_00070
- "REGULUS: integration and testing of an iodine electric propulsion system", SP2020_00109, **Presenting author**
- "Quasi 2D PIC model of a magnetically enhanced plasma thruster", SP2020_00110
- "Numerical Simulation of the Plume of a Magnetically Enhanced Plasma Thruster", SP2020_00111

36th International Electric Propulsion Conference (IEPC)

[Vienna, A, 14/09/2019 – 19/09/2019]

Session chair

- "Numerical Model of a Magnetically Enhanced Plasma Thruster", IEPC-2019-415, **Presenting author**
- "REGULUS: Iodine Fed Plasma Propulsion System for Small Satellites", IEPC-2019-417, **Presenting author**
- "REGULUS: Know-How Acquired on Iodine Propellant", IEPC-2019-419, **Presenting author**
- "Inductive plasma thruster (IPT) for an atmosphere breathing electric propulsion system: Design and set in operation", IEPC-2019-A-488

6th Space Propulsion Conference

[Seville, E, 13/05/2018 – 17/05/2018]

- "Numerical model of the Plasma Source of a Helicon Plasma Thruster", SP2018_00424, **Presenting author**
- "Development of a Miniature Plasma Propulsion Module for Small Satellites", SP2018_00432, **Presenting author**

35th International Electric Propulsion Conference (IEPC)

[Atlanta GA, USA, 07/10/2017 – 11/10/2017]

- "Study on the Influence of the Magnetic Field Topology on the Power Deposition in a Helicon Plasma Source", IEPC-2017-58, **Presenting author**
- "Development and test of a high power RF plasma thruster in project SAPERE-STRONG", IEPC-2017-462, **Presenting author**

- "Development and testing of a miniature Helicon plasma thruster", IEPC-2017-519, **Presenting author**
- "Transport and Acceleration Phenomena in Helicon Plasma Thrusters", IEPC-2017-565, **Presenting author**

7th European Conference for Aeronautics and Space Science (EUCASS)

[Milan, IT, 02/07/2017 – 05/07/2017]

- "Numerical Model of an Helicon Plasma Source for Space Propulsion Application", **Presenting author**

4th IEEE International Workshop on Metrology foe Aerospace

[Padova, IT, 20/06/2017 – 22/06/2017]

- "Development of a counterbalanced pendulum thrust stand for electric propulsion", **Presenting author**

COMSOL conference

[Munich, DE, 11/10/2016 – 13/10/2016]

- "Numerical Investigation into the Power Deposition and Transport Phenomena in Helicon Plasma Sources", **Presenting author**
- "Numerical simulation of Vibrationally Active Ar-H2 Microwave Plasma", **Presenting author**

INVITED TALKS

EMI effects generated by electric propulsion on spacecraft

[24/05/2022]

2022 ESA Workshop on Aerospace EMC, 23-25 May 2022, on-line event

Electric propulsion systems for CubeSats

[12/12/2021]

Seminar for the Master's degree in Aerospace Engineering, University of Bologna, Forlì, IT

Keynote: Electric Propulsion for CubeSats: a Review

[27/10/2021]

M. Magarotto, M. Manente, D. Pavarin, “Electric Propulsion for CubeSats: a Review”, IAC-21,C4,8-B4.5A,1,x64088, 72th International Astronautical Congress (IAC), Dubai, UAE, 2021

Space electric propulsion

[10/01/2021]

Seminar for the PhD course in Sciences, Technologies and Measurements for Space, University of Padova, Padova, IT

INTERNATIONAL COLLABORATIONS

Center of Studies and Activities for Space "Giuseppe Colombo" - University of Padova, Padova, Italy

- PhD degree 2015-2019
- Assegno di ricerca 2018-2020
- Borsa di ricerca 2021

Department of Industrial Engineering - University of Padova, Padova, IT

- Assegno di ricerca 2020-2021
- Assegno di ricerca 2022

Department of Information Engineering - University of Padova, Padova, IT

Collaboration in the frame of plasma antennas

- G. Mansutti, P. De Carlo, M. A. Hannan, F. Boulos, P. Rocca, A.-D. Capobianco, M. Magarotto, A. Tuozzi, "Modeling and design of a plasma-based transmit-array with beam scanning capabilities." Results in Physics 16 (2020): 102923
- P. de Carlo, M. Magarotto, G. Mansutti, A. Selmo, A.-D. Capobianco, D. Pavarin, “Feasibility study of a novel class of plasma antennas for SatCom navigation systems”, Acta Astronautica 178 (2021): 846-853

- M. Magarotto, P. De Carlo, G. Mansutti, F. J. Bosi, N. E. Buris, A.-D. Capobianco, D. Pavarin, "Numerical Suite for Gaseous Plasma Antennas Simulation", IEEE Transactions on Plasma Science 49.1 (2021): 285-297
- P. De Carlo, M. Magarotto, G. Mansutti, S. Boscolo, A.-D. Capobianco, D. Pavarin, "Experimental Characterization of a Plasma Dipole in the UHF band", IEEE Antennas and Wireless Propagation Letters 20.9 (2021): 1621-1625
- G. Mansutti, P. De Carlo, M. Magarotto, M. A. Hannan, P. Rocca, A.-D. Capobianco, D. Pavarin, A. Tuozzi, "Design of a Hybrid Metal-Plasma Transmit-Array with Beam-Scanning Capabilities", IEEE Transactions on Plasma Science 50.3 (2022): 662-669

Department of Industrial Engineering - University of Bologna, Forlì, IT

Collaboration in the frame of numerical codes to simulate the plasma dynamics and electromagnetic wave propagation in electric plasma thrusters

- N. Souhair, M. Magarotto, E. Majorana, F. Ponti, D. Pavarin, "Development of a lumping methodology for the analysis of the excited states in plasma discharges operated with argon, neon, krypton, and xenon", Physics of Plasmas 28.9 (2021): 093504
- N. Souhair, M. Magarotto, F. Ponti, D. Pavarin, "Analysis of the plasma transport in numerical simulations of helicon plasma thrusters", AIP Advances 11.11 (2021): 115016
- M. Magarotto, S. Di Fede, N. Souhair, S. Andrews, F. Ponti, "Numerical suite for cathodeless plasma thrusters", Acta Astronautica 197 (2022): 126-138

ELEDIA Research Center - University of Trento, Trento, IT

Collaboration in the frame of plasma antennas

- G. Mansutti, P. De Carlo, M. A. Hannan, F. Boulos, P. Rocca, A.-D. Capobianco, M. Magarotto, A. Tuozzi, "Modeling and design of a plasma-based transmit-array with beam scanning capabilities." Results in Physics 16 (2020): 102923
- G. Mansutti, P. De Carlo, M. Magarotto, M. A. Hannan, P. Rocca, A.-D. Capobianco, D. Pavarin, A. Tuozzi, "Design of a Hybrid Metal-Plasma Transmit-Array with Beam-Scanning Capabilities", IEEE Transactions on Plasma Science 50.3 (2022): 662-669

Tony Davies High Voltage Laboratory - University of Southampton, Southampton, UK

Collaboration in the frame of plasma antennas

- A. Daykin-Iliopoulos, F. J. Bosi, F. Coccaro, M. Magarotto, A. Papadimopoulos, P. De Carlo, C. Dobranszki, I. O. Golosnoy, S. Gabriel, "Characterisation of a thermionic plasma source apparatus for high-density gaseous plasma antenna applications", Plasma Sources Science and Technology 29.11 (2020): 115002

Department of Electrical & Computer Engineers - Aristotle University of Thessaloniki, Thessaloniki, GR

Collaboration in the frame of plasma antennas

- A. Daykin-Iliopoulos, F. J. Bosi, F. Coccaro, M. Magarotto, A. Papadimopoulos, P. De Carlo, C. Dobranszki, I. O. Golosnoy, S. Gabriel, "Characterisation of a thermionic plasma source apparatus for high-density gaseous plasma antenna applications", Plasma Sources Science and Technology 29.11 (2020): 115002

School of Communication and Information Engineering - Shanghai University, Shanghai, CN

Collaboration in the frame of plasma antennas

- M. Magarotto, P. De Carlo, G. Mansutti, F. J. Bosi, N. E. Buris, A.-D. Capobianco, D. Pavarin, "Numerical Suite for Gaseous Plasma Antennas Simulation", IEEE Transactions on Plasma Science 49.1 (2021): 285-297

Wellman Center for Photomedicine - Harvard Medical School, Boston MA, USA

Collaboration in the frame of plasma antennas

- G. Mansutti, P. De Carlo, M. Magarotto, M. A. Hannan, P. Rocca, A.-D. Capobianco, D. Pavarin, A. Tuozzi, "Design of a Hybrid Metal-Plasma Transmit-Array with Beam-Scanning Capabilities", IEEE Transactions on Plasma Science 50.3 (2022): 662-669

Depertment of Chemical Sciences - University of Padova, Padova, IT

Collaboration in the frame of plasma-based reactors for water treatment

- M. Saleem, O. Biondo, G. B. Sretenovic, G. Tomei, M. Magarotto, D. Pavarin, E. Marotta, C. Paradisi, "Comparative performance assessment of plasma reactors for the treatment of PFOA; reactor design, kinetics, mineralization and energy yield." Chemical Engineering Journal 382 (2020): 123031

Department of Aerospace Science and Technology - Politecnico di Milano, Milan, IT

Collaboration in the frame of numerical codes to simulate the performance of electric plasma thrusters

- M. Guaita, M. Magarotto, M. Manente, D. Pavarin, M. Lavagna, “Semi-analytical Model of a Helicon Plasma Thruster”, IEEE Transactions on Plasma Science 50.2 (2022): 425-438

Institute of Space Systems (IRS) - University of Stuttgart, Pfaffenwaldring, DE

Collaboration in the frame of electromagnetic codes to simulate the wave propagation in electric plasma thrusters

- F. Romano, G. Herdrich, P. C. E. Roberts, ..., M. Magarotto, D. Pavarin, “Inductive Plasma Thruster (IPT) design for an Atmosphere-Breathing Electric Propulsion System (ABEP)”, IAC-19,C4,6,3,x49922, 70th International Astronautical Congress (IAC), Washington, DC, USA, 2019

PROJECTS

IRIS (hIgh peRformance computIng plaSma)

[2021]

Funding body: PRACE (Partnership for Advanced Computing in Europe)

Scope:

In order to optimize and customize electric plasma thrusters, accurate numerical simulations are mandatory. The approach adopted is the particle-in-cell, namely the trajectories of the particles are integrated with a lagrangian approach while the arising electromagnetic field are solved on a grid. The project aims to speed up the particle-in-cell software used to simulate plasma thrusters, namely the Java open-source code SPIS in order to make it suitable for High Performance Computing (HPC).

Contribution:

Supervision of the code development, physical analysis.

Plasma Basato su Miscele di Gas per lo Spazio e le Telecomunicazioni (PlasMix4Space)

[2019 – 2022]

Funding body: University of Padova

Scope:

The project aims at using gas mixtures to increase the efficiency of plasma sources employed in the fields of space propulsion and telecommunications. A fluidic line has been developed to mix the gases. Prototypes of plasma antennas and electric space thrusters have been realized and tested.

Contribution:

Development and test of the fluidic line to mix gases, the plasma antenna prototypes, and the plasma thruster prototypes; selection of appropriate gas mixtures.

E-REGULUS

[2019 – 2022]

Funding body: European Space Agency (ESA)

Scope:

First generation CubeSats and MicroSatellites has been originally developed for educational missions. The strong maturation of these platforms is making them ready to face new important challenges. To fully exploit their enormous potential, they require mobility. The E-REGULUS project deals with an electrodeless, cathodeless, multi-propellant, radiofrequency based thruster specifically designed to deal with the needs of the next generation platforms. The target thrust is 1.5 mN at an operation power of 150 W.

Contribution:

Desin of the thruster via numerical simulations of the plasma dynamics and the electromagnetic wave propagation. To aid the development of the electronic boards (Power Processing Unit) to ignite and sustain the plasma via numerical simulations of the electromagnetic response of the thruster.

Antenne al Plasma – Tecnologia abilitante per SATCOM (EPT.COM)

[2017 – 2020]

Funding body: Italian Space Agency (ASI)

Scope:

The EPT.COM (Enabling Plasma Technology towards satellite COMmunications) project aims at performing fundamental research to improve the performance of plasma technology in order to design and develop a new generation of space-born-antennas. Objective of EPT.COM is to design and develop a new generation of space-born-antennas overcoming the limitation of plasma source technology currently applied. Two distinct plasma antenna concepts have been analyzed, namely an active concept (i.e., plasma dipole), and a transmit-array.

Contribution:

Development, simulation, and tests of plasma sources and plasma antennas.

REGULUS

[2017 – 2021]

Funding Body: Technology for Propulsion and Innovation S.p.A.

Scope:

The project aims at the development of an electric thruster targeted at CubeSats. The target performance is 0.6 mN with 60 W input power. The propellant is solid iodine. The thruster has been demonstrated in orbit on March 2021.

Contribution:

Desin of the thruster via numerical simulations of the plasma dynamics and the electromagnetic wave propagation. To aid the development of the electronic boards (Power Processing Unit) to ignite and sustain the plasma via numerical simulations of the electromagnetic response of the thruster.

Plasma Antenna Technologies (PATH) H2020-MSCA-RISE-2016

[2016 – 2022]

Funding body: European Commission

Scope:

The project is intended to promote a collaborative researches focused in the development of high density plasma sources implemented with the exchange of staff personnel between the partners of the network. The research will also address transfer of knowledge and training of the researchers in the specific field of plasma sources and its applications in the telecommunication sector.

Contribution:

Development, simulation, and tests of plasma sources and plasma antennas.

SAPERE (Space Advanced Project for Excellence in Research and Enterprise)

[2013 – 2017]

Funding body: Ministero dell'Università e della Ricerca (PON Ricerca e Innovazione)

Scope:

The project SAPERE is divided in two sub-projects STRONG (*Sistemi Tecnologie e Ricerche per l'Operatività Nazionale Globale*) and SAFE (*Space Assets For Emergency*). The objective of STRONG is the realization of a Space Tug propelled with electric plasma thrusters.

Contribution:

Design of the electric plasma thruster via numerical simulations of the plasma dynamics and electromagnetic wave propagation.

MANAGEMENT AND LEADERSHIP SKILLS

Co-supervisor PhD programme, S. Di Fede

S. Di Fede, "Numerical and experimental investigation into the performance of a Helicon Plasma Thruster" (ongoing), University of Padova, Padova, Italy. Supervisor: Prof. Daniele Pavarin

Co-supervisor PhD programme, N. Souhair

N. Souhair, "Development of a Numerical Tool for the Simulation, Design and Optimization of a Helicon Plasma Thruster" (ongoing), University of Bologna, Forlì, Italy. Supervisor: Prof. Fabrizio Ponti

Tutor Borsa di Ricerca, S. Andrews

"Code Development for Plasma Source Simulations and Numerical Study on Plasma Antennas" (2020), in the frame of the project "Plasma Antenna Technologies – PATH" G.A. 734629 (2020-MSCA-RISE-2016/H2020-MSCA-RISE-2016). Supervisor: Prof. Daniele Pavarin

Co-supervisor Master's Degree thesis, M. P. Tangaro

"Experimental characterization of a fluidic line for the realization of plasma gas mixtures" (2022), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisors: Dr. P. De Carlo and Dr. M. Magarotto

Co-supervisor Master's Degree thesis, G. Dalla Volpe

"Optimization of a Cathode-less plasma thruster" (2021), Polytechnic University of Torino, Torino, IT. Supervisor: Prof. L. Casalino; Co-supervisor: Dr. M. Magarotto.

Co-supervisor Master's Degree thesis, N. Magro

"Performance enhancing strategies for small helicon plasma thrusters" (2021), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavrin; Co-supervisor: Dr. M. Magarotto

Co-supervisor Master's Degree thesis, R. Premuni

"Thermal balance of neutral gas in a helicon plasma thruster" (2021), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisor: Dr. M. Magarotto

Co-supervisor Master's Degree thesis, M. Guaita

"Semi-Analytical Mono-Dimensional Modelling of Cathodeless Plasma Thrusters" (2021), Polytechnic University of Milano, Milano, IT. Supervisor: Prof. Michele Lavagna; Co-supervisors: Dr. M. Magarotto, Dr. Marco Manente.

Co-supervisor Master's Degree thesis, C. Isone

"Ottimizzazione di un motore elettrico attraverso la simulazione del plasma nella regione di sorgente" (2021). University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisor: Dr. M. Magarotto

Co-supervisor Master's Degree thesis, J. Giacomelli

"Experimental characterization and optimization of plasma sources for a Gaseous Plasma Antenna (GPA)" (2020), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisors: Dr. P. De Carlo and Dr. M. Magarotto

Co-supervisor Master's Degree thesis, J. Bellini

"Ottimizzazione numerica di un Helicon Plasma Thruster di media potenza" (2020), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisor: Dr. M. Magarotto

Co-supervisor Master's Degree thesis, A. Modesti

"Numerical optimization of a Quasi-2D Particle-In-Cell code for preliminary design of RF Plasma Thrusters" (2020), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisors: Dr. M. Magarotto, Dr. M. Manente, Dr. M. Minute

Co-supervisor Master's Degree thesis, D. Vallisari

"Indagine Numerica del Meccanismo di Accelerazione del Plasma in un Propulsore Helicon al Plasma" (2020), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisor: Dr. M. Magarotto

Co-supervisor Master's Degree thesis, I. Bevilacqua

"Numerical and experimental optimization of the magnetic configuration of a RF plasma thruster" (2019), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisors: Dr. M. Minute and Dr. M. Magarotto

Co-supervisor Master's Degree thesis, A. Colovini

"Optimization of the magnetic configuration of STRONG RF thruster" (2018), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisors: Dr. F. Trezzolani and Dr. M. Magarotto

Co-supervisor Master's Degree thesis, M. Minute

"Preliminary Design of a Iodine Fed-System for a Magnetically Enhanced Thruster" (2018), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisors: Dr. F. Trezzolani and Dr. M. Magarotto

Co-supervisor Master's Degree thesis, D. Scalzi

"Preliminary Thermo-Structural Design of a Cathodeless RF Thruster" (2018), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisors: Dr. F. Trezzolani and Dr. M. Magarotto

Co-supervisor Master's Degree thesis, D. Moretto

"Development and Testing of a Thrust Measurement System for Plasma Thrusters Characterization and Optimization" (2016), University of Padova, Padova, IT. Supervisor: Prof. Daniele Pavarin; Co-supervisors: Dr. F. Trezzolani and Dr. M. Magarotto

HONOURS AND AWARDS

Outstanding Reviewer Award 2021

IOP Publishing [04/2022]

Outstanding Reviewer for "Journal of Physics D: Applied Physics" in 2021

LANGUAGE SKILLS

Mother tongue(s): **Italian**

Other language(s):

English

LISTENING C1 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

DIGITAL SKILLS

My Digital Skills

Excellent knowledge of the Matlab language / Excellent knowledge of the COMSOL software / Excellent knowledge of the OpenFOAM library / Good knowledge of C and C++ languages / Good knowledge of SPIS software / Intermediate knowledge of Fortran language / Good knowledge of the Office Package / Excellent knowledge of LaTeX / Excellent knowledge of the CST Studio Suite software

RECOMMENDATIONS

Associate Professor of Space Propulsion, University of Padova

Name: Daniele Pavarin

Phone number: [redacted]
Email: [redacted]

Master's degree thesis supervisor

PhD thesis supervisor

Postdoctoral fellowships supervisor

Associate Professor of Electromagnetic Fields, University of Padova

Name: Antonio-Daniele Capobianco
Phone number [redacted]
Email: [redacted]

Collaboration on plasma antenna projects

DRIVING LICENCE

Driving Licence: A

Driving Licence: B