

Michela Gelfusa Curriculum Vitae

Personal information

First and last name	Michela Gelfusa
Nationality	Italian
Place and date of birth	Rome, June 1 st , 1974
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Work Experience

Michela Gelfusa received her M. S. degree in Energy and Nuclear Engineering and her Ph.D degree in Quantum Electronic and Plasma Physics from the University of Rome "Tor Vergata". From 2012 she is a researcher at the University of Tor Vergata. She also received the Italian National Scientific Qualification as Associate Professor of Nuclear Engineering.

Her research interests have been mainly in the field of nuclear fusion and environmental physics, involving both civil and military applications. In the framework of the collaboration between the University of Tor Vergata and the Joint European Torus (JET), the largest Tokamak in the world, she has been involved in various diagnostics, in particular polarimeter/interferometer, and in the development of advanced data analysis methods.

An essential ingredient in the collaboration with JET has been the application of symbolic regression via genetic programming to various physical problems of general interest for the Tokamak community. She is author of more than 160 papers published on International Journal and Conferences Proceedings and one Italian Patent.

International Research Collaborations

- 2008 -present day
 - Research Centre EUROfusion (EFDA)-JET (Joint European Torus)
 - Position Visiting Scientist/Seconded
 - Research fields
 - Study of the optical and mechanical components of the JET interferometer/polarimeter
 - Analysis of Polarimetric data, in particular: i) Cotton-Mouton in high current discharges; ii) Faraday rotation signals and implications on equilibrium. Also, analysis of calibration and use of Cotton-Mouton for fringe jump corrections.
 - Image processing and support to viewing system during operation.
 - Anomaly detection and disruptions in Tokamaks
 - Inverse problems: in particular magnetic equilibrium and tomographic reconstructions.
- 2017 -2018
 - Research Centre ITER IO
 - Position Responsible officer for the task: "TO#07 - ECH-CTS stray loads testing for windows assembly" (contract number IO/16/CT/SAP 6000000181).

- 2010 –2011

Research Centre Joint European Torus

Position Project leader for the enhancement:
JW10-OEP-ENEA-90 - Real-Time Measurement & Control:
Diagnostics & Infrastructure.

Academic Positions:

- Member of the teaching/scientific panel of the "Industrial Engineering" PhD program of Rome "Tor Vergata" University (2017 -).
- Lecturer of "Diagnostic techniques for thermonuclear reactors" at University of Tor Vergata – Department of Industrial Engineering

Publications in International Journals

1. **Gelfusa M.**, Rossi R., Lungaroni M., Belli F., Spolladore L., Wyss I., Gaudio P., Murari A. and JET Contributors, "Advanced pulse shape discrimination via machine learning for applications in thermonuclear fusion", Nuclear Instruments and Methods in Physics Research Section A, 974, 2020
2. Murari A., Rossi R., Peluso, E., Lungaroni M., Gaudio P., **Gelfusa M.**, Ratta, G., Vega, J. and JET contributors "On the transfer of adaptive predictors between different devices for both mitigation and prevention of disruptions", Nuclear Fusion 2020
3. Murari, A., Peluso, E., Craciunescu, T., Lowry, C., Aleiferis, S., Carvalho, P., **Gelfusa, M.**, Investigating the thermal stability of highly radiative discharges on JET with a new tomographic method, (2020) Nuclear Fusion, 60 (4), art. no. 046030
4. Romanelli, F., **Gelfusa, M.**, On the optimal mix of renewable energy sources, electrical energy storage and thermoelectric generation for the de-carbonization of the Italian electrical system, (2020) European Physical Journal Plus, 135 (1), art. no. 72
5. Murari, A., Lungaroni, M., **Gelfusa, M.**, Testing the consistency of multimachine databases for physical studies of regression, (2020) Nuclear Fusion, 60 (1), art. no. 015001
6. Peluso, E., Craciunescu, T., Murari, A., Carvalho, P., **Gelfusa, M.**, A comprehensive study of the uncertainties in bolometric tomography on JET using the maximum likelihood method, (2019) Review of Scientific Instruments, 90 (12), art. no. 123502,
7. Murari, A., Lungaroni, M., Peluso, E., Craciunescu, T., **Gelfusa, M.**, A Model Falsification Approach to Learning in Non-Stationary Environments for Experimental Design, (2019) Scientific Reports, 9 (1), art. no. 17880, .
8. Peluso, E., Craciunescu, T., **Gelfusa, M.**, Murari, A., Carvalho, P.J., Gaudio, P., On the effects of missing chords and systematic errors on a new tomographic method for JET bolometry, (2019) Fusion Engineering and Design, 146, pp. 2124-2129.
9. Murari, A., Lungaroni, **M.**, **Gelfusa, M.**, Peluso, E., Vega, J., Adaptive learning for disruption prediction in non-stationary conditions, (2019) Nuclear Fusion, 59 (8), art. no. 086037

10. A. Murari, M. Lungaroni, E. Peluso , P. Gaudio, J. Vega, S. Dormido-Canto, M. Baruzzo and **M. Gelfusa**, "Adaptive predictors based on probabilistic SVM for real time disruption mitigation on JET (2018) Nuclear Fusion , 58, 056002 (16pp)
11. Ciparisse, J.F., Malizia, A., Poggi, L.A., Tieri, F., **Gelfusa, M.**, Murari, A., Papa, C.D., Giovannangeli, I., Gaudio, P., "3D numerical simulations of a LOVA reproduction inside the new facility STARDUST-UPGRADE" (2017) Journal of Instrumentation, 12 (2), art. no. C02001 .
12. Murari, A., Peluso, E., Gaudio, P., **Gelfusa, M.**, "Robust scaling laws for energy confinement time, including radiated fraction, in Tokamaks", (2017) Nuclear Fusion, 57 (12), art. no. 126017.
13. Murari, A., Peluso, E., Vega, J., **Gelfusa, M.**, Lungaroni, M., Gaudio, P., Martínez, F.J., "Determining the prediction limits of models and classifiers with applications for disruption prediction in JET", (2017) Nuclear Fusion, 57 (1), art. no. 016024.
14. Camplani, M., Malizia, A., **Gelfusa, M.**, Barbato, F., Antonelli, L., Poggi, L.A., Ciparisse, J.F., Salgado, L., Richetta, M., Gaudio, P., "Image computing techniques to extrapolate data for dust tracking in case of an experimental accident simulation in a nuclear fusion plant, (2016) Review of Scientific Instruments, 87 (1), art. no. 013504.
15. Malizia, A., **Gelfusa, M.**, Francia, G., Boccitto, M., Del Vecchio, M., Di Giovanni, D., Richetta, M., Bellecci, C., Gaudio, P., "Design of a new experimental facility to reproduce LOVA and LOCA consequences on dust resuspension", (2015) Fusion Engineering and Design, 98-99, pp. 2191-2195.
16. Murari, A., **Gelfusa, M.**, Peluso, E., Gaudio, P., Mazon, D., Hawkes, N., Point, G., Alper, B., Eich, T., "Improved equilibrium reconstructions by advanced statistical weighting of the internal magnetic measurements", (2014) Review of Scientific Instruments, 85 (12), art. no. 123507 .
17. **Gelfusa, M.**, Murari, A., Lupelli, I., Hawkes, N., Gaudio, P., Baruzzo, M., Brix, M., Craciunescu, T., Drozdov, V., Meigs, A., Peluso, E., Romanelli, M., Schmuck, S., Sieglin, B., "Influence of plasma diagnostics and constraints on the quality of equilibrium reconstructions on Joint European Torus", (2013) Review of Scientific Instruments, 84 (10), art. no. 103508.
18. **Gelfusa, M.**, Murari, A., Gaudio, P., Boboc, A., Mazon, D., Avino, F., Lupelli, I., Orsitto, F.P., Tudisco, O., "New approximations and calibration methods to provide routine real-time polarimetry on JET", (2012) IEEE Transactions on Plasma Science, 40 (4), art. no. 6156793, pp. 1149-1161.
19. **Gelfusa, M.**, Brombin, M., Gaudio, P., Boboc, A., Murari, A., Orsitto, F.P., "Modelling of the signal processing electronics of JET interferometer- polarimeter", (2010) Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, 623 (2), pp. 660-663.
20. **Gelfusa, M.**, Murari, A., Gaudio, P., Boboc, A., Brombin, M., Orsitto, F.P., Giovannozzi, E., "A new calibration code for the JET polarimeter", (2010) Review of Scientific Instruments, 81 (5), art. no. 053507.

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