Alessandra Giunta

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Area of expertise

Solar physics – in particular solar upper atmosphere
Solar abundances and First Ionisation Potential (FIP) composition maps
Space-borne EUV spectrometers (calibration and data analysis) – specifically Solar Orbiter/SPICE, IRIS, Hinode/EIS, SoHO/SUMER, SoHO/CDS
UV/EUV spectroscopy: astrophysical and laboratory plasma applications
Theoretical atomic modelling for several plasma environments (solar atmosphere and nuclear fusion)
Support to Space Weather studies

Qualifications

July 2011	PhD in Physics, Department of Physics, University of Strathclyde, UK.
July 2005	Degree in Physics (“Laurea in Fisica”) with specialization “Astrophysics and Space Physics”, Department of Physics and Astronomy, University of Catania, Italy, 1st Class (110/110 e lode).

Career history

December 2024-present	**Associate Professor (Professore di seconda fascia), in the scientific education sector PHYS-05/B Physics of the Earth System, Planets, Space and Climate, Department of Physics and Astronomy "Ettore Majorana", University of Catania (Italy).**
October 2013-December 2024	**Senior Scientist (band E): Solar Physicist (Solar Orbiter/SPICE RAL Operation Scientist and Co-Investigator) and Spectroscopist, Rutherford Appleton Laboratory, UK Research and Innovation, Science and Technology Facilities Council, UK**
Responsible of scientific support for the development of the Spectral Imaging of the Coronal Environment (SPICE) spectrometer, which includes instrument radiometric calibration, preparation for science operations in collaboration with the SPICE team and other Solar Orbiter instruments (attending the operation meetings and workshops and being a member of the science operation team) and preparation of post-launch commissioning and operations. STFC RAL In-House Research Grant (in collaboration with JET facilities, Culham Science Centre, UK): updating and maintaining the fundamental and derived atomic data for key elements (e.g. magnesium, sulphur, neon, silicon, argon, iron) adopted for the analysis of current and future solar observations and for ground calibration of UV spectrometers.	
January 2025-present	**Fellow at INAF (Istituto nazionale di Astroficica) - Osservatorio Astrofisico di Catania, Catania, Italy**
December 2024-present	**Visiting Scientist at Rutherford Appleton Laboratory (RAL Space), UK Research and Innovation, Science and Technology Facilities Council, UK**
January 2018-December 2020	**Visiting Fellow (“Contratto di associatura”) at the I.S.T.P. Istituto per la Scienza e Tecnologia dei Plasmi - CNR, Milan, Italy**

Research support and collaboration on plasma diagnostics for the GyM (Gyrotron Machine) magnetically confined linear device, specifically advanced theoretical atomic modelling and data analysis for the interpretation of the argon plasma.	
August 2011-September 2013	**Research Fellow, Department of Physics, University of Strathclyde, UK**
This post was within the Euratom Framework 7 Support Action on atomic physics for magnetic confinement fusion research in Europe, called ADAS (Atomic Data and Analysis Structure)-EU. Main duties included providing calculations of atomic data and analysis of astrophysical and fusion plasmas. In particular I helped create the infrastructure for Generalised Collisional-Radiative (GCR) population and coefficient modelling for medium-weight species, within the work packages WP27 (Distorted Wave baseline atomic calculations using AUTOSTRUCTURE code) and WP28 (GCR ionisation and recombination) of the ADAS-EU project. Other responsibilities were dissemination and training (supporting visits to Euratom Associated Laboratories and intensive ADAS courses).	
April 2011-July 2011	**Research Assistant, Department of Physics, University of Strathclyde, UK**
Interpretation of transient ionisation in the context of both solar flares and nuclear fusion (in particular within the MAST-Upgrade Spectroscopic Divertor Diagnostic Project) and update of atomic data, including carbon, oxygen and argon, for astrophysical and fusion investigations.	
March 2011	**Research Contract, Armagh Observatory, UK**
Investigation and analysis of line contribution functions under non-equilibrium conditions and comparison with past solar observations (from the Solar Maximum Mission) and recent Interface Region Imaging Spectrograph (IRIS) measurements.	
August 2006- November 2006	**Research Contract, INAF-Astrophysics Observatory, Catania, Italy**
This post was within the Italian Space Agency (ASI) project "Study of the solar atmosphere physical conditions using advanced diagnostic techniques". Main duties included the identification of solar spectral lines in the UV-EUV range, observed by the Coronal Diagnostic Spectrometer (CDS) aboard the Solar and Heliospheric Observatory (SOHO) and the use of the differential emission measure diagnostic technique to analyse the transition region and coronal spectrum in solar active regions.	

Participation in observational and experimental campaigns

February 2020-present	Coordination and support of observational campaign with Solar Orbiter. Solar Orbiter Observing Plan (SOOP) coordinator of SPICE full disk mosaic, Connection Mosaic, Earth Quadrature, Composition versus Height, High Latitude Polar Survey, SPICE Full Disk Mosaic; SPICE contact point for the following SOOPs: Slow Wind Connection, Coronal Hole Boundary Expansion, Coronal Dynamics, RS Burst.
September 2011, December 2013	XRF measurements using the handheld analyser Innov-X system Alpha 4000 and Raman measurements using BTR111 MiniRam TM (Università di Messina, Messina, Italy)
July 2012	Co-Investigator in the experiment for NRCA (Neutron Resonance Capture Analysis) and ND (Neutron Diffraction) using INES instrument (ISIS facilities, Harwell Campus, Chilton, UK - experiment number RB1261011)
March 2010	Spectroscopic solar observations using SoHO/CDS and Hinode/EIS (HOP155)
April 2009	Spectroscopic solar observations using SoHO/SUMER, SoHO/CDS and Hinode/EIS (JOP 220/HOP109)
August 2004, October 2005	Observations of RSCVn system ii Peg ("M. G. Fracastoro" Mountain Station Serra La Nave, Mt. Etna, Catania, Italy)

Teaching activities

October 2025-present	Plasma Spectroscopy – MSc in Physics (50 hours lecturing plus exams and tutoring), University of Catania, Italy Astrophysics - MSc in Mathematics (47 hours lecturing plus exams and tutoring), University of Catania, Italy Solar Physics – MSc in Physics (42 hours lecturing plus exams and tutoring), University of Catania, Italy

January-September 2025	Physics 1 (Kinematics, Dynamics, Fluidics and Thermodynamics)– Industrial and Management Engineering (87 hours lecturing plus exams and tutoring), University of Catania, Italy

Teaching and tutoring within the ADAS-EU training courses and preparation of most of the tutorial material, in particular all the demonstration scripts; providing in addition user guides for each module, which are available in the ADAS-EU website (http://www.adas-fusion.eu/course_material_2013.php).
Main lectures performed: Excited population structure, Ionisation state and Differential Emission Measure.

July 2013	National Fusion Research Institute, Daejeon, Korea
June 2013	National Institute for Fusion Science, Toki, Japan
May-June 2013	Academy of Sciences, Institute of Plasma Physiscs, Hefei, China
September-October 2012	CEA-Cadarache, France
March 2012	Consorxio RFX, Padua , Italy
October 2011	Auburn University, Alabama, US

International Space Science Institute research teams

2017 - 2021	ISSI (International Space Science Institute – Bern, Switzerland) team "Linking the Sun to the heliosphere using composition data and modelling "
2013 - 2016	ISSI team "Non-Equilibrium Processes in the Solar Corona and their Connection to the Solar Wind"

Referee role for international journals

2025	Philosophical Transactions of the Royal Society A, ISSN: 1471-2962
2019-present	Spectroscopic Letters, ISSN: 0038-7010
2017-present	Fusion Science & Technology, ISSN: 1536-1055
2015-present	Astronomy and Astrophysics, ISSN: 0004-6361
2014-present	The Astrophysical Journal, ISSN: 0004-637X

Membership

2018-present	Appointed member of the UK AMOR (Atomic, Molecular, Optical R-matrix) advisory committee.
2014-present	Asia Oceania Geosciences Society (AOGS) member.
2013-present	UK APAP (Atomic Processes for Astrophysical Plasmas) group (University of Cambridge and University of Strathclyde,UK) member.
2008-present	Royal Astronomical Society (RAS) member.
2007-present	ADAS group (and ADAS-EU from 2011 to 2013) member.

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