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ABOUT ME

I am a researcher astronomer at INAF-Turin Astrophysical Observatory, Italy. My research field is Solar Physics, and in particular the UV-EUV Spectroscopy and WL Coronagraphy of the Solar Corona for the study of Solar Wind, Coronal Streamers and Coronal Mass Ejections (CMEs). Moreover, I have experience in supporting the development of new instrumentations: I am actively involved in the ESA Solar Orbiter Metis and PROBA-3 ASPIICS space-based coronagraphs, and I supported calibrations for ground-based solar eclipse observations.

WORK EXPERIENCE

Researcher (permanent staff)

INAF - Turin Astrophysical Observatory [15/06/2011 – Current]

City: Turin

Country: Italy

Scientific research: determination of physical parameters of CMEs from data analysis; simulation of expected appearance of CMEs in future WL and UV coronagraphs (such as Solar Orbiter Metis and ASO-S LST); development and optimization of new diagnostic techniques to be applied to future coronagraphic observations; studies of geo-effective eruptions. **Instrument development support:** optimization of PROBA-3 ASPIICS narrow-band filters; definition of PROBA-3 on-board algorithm for SPS metrology system; construction of synthetic coronagraphic images to test data diagnostics; simulation of the expected illumination level in the penumbra of PROBA-3 coronagraph occulter.

Researcher (temporary contract)

INAF - Turin Astrophysical Observatory [01/09/2007 – 14/06/2011]

City: Turin

Country: Italy

Scientific research: 3D reconstructions of solar eruptions from stereoscopic data; combination of WL and EUV observations to follow the CME-driven shock early evolution; observations and MHD numerical simulations of multiple CMEs; estimate of 3D reconstruction errors with polarization ratio technique; studies of post-CME current sheets with UV spectra. **Instrument development support:** characterization of compression algorithms for Solar Orbiter Metis data; simulation of expected Lyman-alpha spectra produced by Metis spectroscopic channel (removed); development of the "CME flag" algorithm for Metis coronagraph; estimate of the expected SiXI contamination in the Hell images for SCORE; co-alignment between SCORE, LASCO, UVCS images; simulation of FeXIV line observations with CorMag for July 11th 2010 eclipse.

Post-doc (research grant)

INAF - Arcetri Astrophysical Observatory [01/02/2006 – 31/08/2007]

City: Florence

Country: Italy

Scientific research: characterization of sungrazing comets with UV spectra and WL coronagraphic images; studies of low-frequency Lyman-alpha fluctuations in polar coronal holes; studies of side magnetic reconnections induced by CMEs in the nearby corona.

EDUCATION AND TRAINING

Ph.D. in Astronomy

supervisor: *Dr. G. Poletto* (poletto@arcetri.astro.it) [10/2002 – 02/2005]

Address: Florence University and INAF - Arcetri Astrophysical Observatory Largo Enrico Fermi, 5, 50125 Florence (Italy)

<https://www.arcetri.inaf.it/>

National qualification for Mathematics & Physics Teaching at High Schools (A038, 47, 48, 49)

SSIS "Scuola di Specializzazione per l'Insegnamento Secondario" (2 years Master) [02/2005 – 05/2007]

Address: University of Pisa Via Fermi, 8, 56100 Pisa (Italy)

<http://www3.unisi.it/did/sss/contatti.htm>

Bachelor Degree in Physics (Specialization: Astronomy)

supervisors: *Dr. G. Poletto* (poletto@arcetri.astro.it) and *Dr. M. Romoli* (romoli@arcetri.astro.it) [09/1995 – 09/09/2002]

Address: University of Florence - Physics Department via G. Sansone, 1, 50019 Sesto Fiorentino (Fi) (Italy)

<https://www.fisica.unifi.it/>

HONOURS AND AWARDS

“Stefan Hepites PRIZE”

Academia Romana, Bucharest, Romania [19/12/2013]

Award given for merits in the study of “Genesis and Evolution of the Coronal Mass Ejections”

“3rd JOSO PRIZE”

JOSO - Joint Organization for Solar Observations [30/09/2009]

Award given to a young Solar Physicist for an outstanding paper in Solar Physics (2009).

TEACHING EXPERIENCE

Academic Lecturer

[2012 – Current]

Temporary Lecturer at the Physics Department of the University of Turin (ind.: FIS/05 Astronomia e Astrofisica) for the Course “Elementi di Elio fisica e Meteorologia spaziale” (48 hours, 6 Credits).

Academic Assistant

[2012 – 2019]

Assistant at the Physics Department of the University of Turin (ind.: FIS/05 Astronomia e Astrofisica) for the Course “Astrophysics Laboratory” (4 hours, course held by Prof. Silvano Fineschi).

Supervisor of post-docs

[2011 – Current]

Supervisor of a 2 years post-doc (Dr. F. Frassati) within the Solar Orbiter Metis project (08/2019-07/2021); **Supervisor** of a 2 years post-doc (Dr. R. Susino) within the European Project SWIFF “Space Weather Integrated Forecasting Framework” (10/2011-11/2013).

Supervisor of Ph.D. students

[2015 – Current]

Supervisor of a Ph.D. student in Physics (Dott. F. Frassati) for a Research Project titled “Interplanetary shocks driven by Coronal Mass Ejections: a study based on data acquired by space-based instrumentations” (10/2015-09/2018); **Co-supervisor** (with Prof. F. Reale, University of Palermo) of a Ph.D. student in Physics (Dott. R. Biondo) for a Research Project titled “MHD numerical simulation of coronal plasma heating and acceleration in support for the analysis of future Metis observations” (10/2019-09/2022).

Supervisor of Degree and Master Theses in Physics

[2009 – Current]

Supervisor of a Degree Thesis in Physics in 2020 (Dott. F. Carella) “Automated identification of Active Regions and Coronal Hole in EUV solar images”; **Supervisor** of a Degree Thesis in Physics in 2015 (Dott. G. Guilluy) “Optimization of the software for the detection of CMEs for METIS instrument on-board ESA-Solar Orbiter”; **Co-Supervisor** of a Master Thesis in Physics in 2014 (Dott. J. Girella) “Magnetic Fields in the Solar Corona: Diagnostics from polarimetric observations of Total Eclipse”; **Supervisor** of a Master Thesis in Physics in 2013 (Dott. M. Morra) “Studio Spettroscopico dei Moti non termici del Plasma Coronale”; **Supervisor** of a Degree Thesis in Physics in 2009 (Dott. M. Calabrese) “Determinazione di Parametri Fisici del Plasma Solare in un Buco Coronale da analisi di Dati Spettroscopici HINODE/EIS”;

Supervisor of Erasmus students

Mentor of an under-graduate Erasmus student (D. Andriuta) in 2018 and 2019 (from June to September) for a project titled “Search of possible correlations between the strength of geomagnetic storms and interplanetary magnetic field measurements”; **Supervisor** of a Master (Erasmus) Thesis in Physics in 2013 (Dott. A. Parashiv) titled “Characterization of Polar Jets in the Solar Corona with HINODE/XRT and SOHO data”.

Supervisor of under-graduate students

[2016 – Current]

Tutor for “alternanza scola-lavoro” of high-school project (A.S. 2018-2019) “Measurement of Earth-Moon distance”; **Supervisor** of a high school dissertation (A.S. 2016-2017) titled “The sun and sunspots: measurement of solar rotation rate”; **Supervisor** of a high school dissertation (A.S. 2017-2018) titled “Measurement of the Hubble constant”.

Other teaching experiences

Lecturer for the 2nd Level University Master “Mathematical and Physical methods for Space Sciences (MPM Space Sciences)”, organized by the University of Turin, Mathematics Department (6 hours, A.A. 2019-2020); **Lecturer** for the course “A cavallo di un raggio di luce: corso di astronomia”, organized by UniTre Torino Metropolis (2 hours, February 29, 2016); **Lecturer** for the course “Dal Sole alle Aurore: effetti imprevedibili della nostra stella” organized for the “Campus MFS di Astronomia e Astrofisica” (6 hours, 6-8 November 2020).

MANAGEMENT AND LEADERSHIP SKILLS

Coordinator of SWELTO Project

Coordinator of project “SWELTO–Space Weather Laboratory in Turin Observatory”, national research project involving 23 people (professors, researchers, technologists and students) from INAF, Turin University and Palermo University.

Metis TT12 coordinator

Coordinator of the Metis Topical Team “*Modelling of CME propagation /evolution in corona and solar wind in connection with Space Weather - TT12*” - an international team with more than 40 participants established in May 2020 and working to maximize the scientific return of the Solar Orbiter - Metis project.

WG SoIo-BepiColombo coordinator

Coordinator of the Working Group “*Shocks, CMEs, and interplanetary propagating disturbances*”, national working group with 27 participants established in June 2020 and working to maximize the possible inter-disciplinary activities among researchers involved in Solar Orbiter and Bepi Colombo mission.

ISSI Team Co-coordinator

Co-coordinator (together with Dr. Li Feng, PMO, China) of ISSI International Team with 11 members, selected in June 2020 and working on “Solar eruptions: preparing for the next generation multi-waveband coronagraphs”.

Local coordinator of Planetary and Solar Physics Group (RSN3)

Coordinator at INAF-Turin Observatory of activities carried out by the Planetary & Solar Physics Group (RSN3).

Coordinator of Editorial Board

Coordinator of the Editorial Board for the redaction of SOHE3 conference proceedings volume, published on Nuovo Cimento and including more than 70 papers.

PROJECTS AND ROLES OF RESPONSIBILITY

Memberships to National and International Teams and Boards

Member of the Director's Supporting Board (November 2019 - present); **Local Coordinator** for Planetary and Solar Physics Group activities (RSN3, November 2019 - present); **Member** of the “Space Weather Working Group” of the Italian Space Agency – ASI (2017 – present); **Member** of Directive Board of the Space Weather Italian Community (SWICO), Italy (2014 – 2016); **Member** of the Ph.D Board, Physics Department, University of Turin (April 2016 – pres.); **Organizer** of the Seminars, INAF –Turin Observatory, Italy (2013 – pres.); **Member** of the “MADAWG - Modelling & Data analysis working Group” for ESA-Solar Orbiter mission (2014 – pres.); **Co-I** of the SWIFF Project (<http://www.swiff.eu/> founded by ERC February 2011 – January 2014); **Co-I** of the Metis Coronagraph for the future Solar Orbiter Mission (2009 – pres.); **Co-I** for the ASPIICS Coronagraph for the future PROBA-3 Mission (2010 – pres.); **Member** of the Faculty Committee for a PhD Thesis (Dr. S. Pucci), University of Florence, Italy (2014); **Member** of the Faculty Committee for a PhD Thesis (Dr. A. Soenen), KU Leuven, Belgium (2011); **Member** of a NASA-Heliophysics Guest Investigator Program Review Panel (February 2012); **Member** of an ISSI-International Team on “Post-CME Current Sheets” (2006-2008, PI: Dr. G. Poletto); **Member** of an ISSI-International Team on “Coronal Magnetometry: Building Tools for Discovery” (selected for 2003-2015, PI: Dr. S. Gibson).

ORGANISATIONAL SKILLS

Organization of Scientific Meeting and Sessions

Chair of LOC and SOC Member for the next “16th European Solar Physics Meeting - ESPM16”, Turin (Italy), September 5-10, 2021; **Chair of SOC and LOC** for the “3rd Meeting of the Italian Solar and Heliospheric Community”, Turin (Italy), October 17-19, 2018; **LOC Member** for the “PROBA-3 Science Working Team Meeting #4”, Turin (Italy), May 18-19, 2016; **SOC Member** for the “2016 Meeting of the Italian Solar & Heliospheric Community”, Rome (Italy), May 30 – June 1st, 2016; **Main Organizer** of 4 Scientific Sessions for the 38th (2010), 39th (2012), 40th (2014) and for 41st (2016) COSPAR Meetings; **SOC Member** for the “Riunione della Comunità Scientifica ed Eliosferica Italiana”, Catania (Italy), September 4-6, 2013; **Chair of SOC and LOC** for the “Second Annual SWIFF Meeting”, January 14-16, 2013, Turin (Italy); **LOC Member** of the “3rd Solar Orbiter Workshop”, Sorrento (Italy), May 25-29, 2009.

CONFERENCES AND SEMINARS

List of invited talks and seminars (last 5 in chronological order)

- Invited Talk: “Coronal Mass Ejections and Shock Fronts observed in WL and UV emissions”, “7th Solar Orbiter workshop”, Granada (Spagna), 3-7/04/17
- Invited Seminar: “Coronagraphic observations of Solar Eruptions and Solar Wind in the UV range: past, present and future”, Purple Mountain Obs., Nanjing (Cina), 27/03/18
- Invited talk: “Coronagraphic observations of Solar Eruptions and Solar Wind in the UV range: past, present and future”, “EGU General Assembly 2019”, Vienna (Austria), 09/04/19
- Invited talk: “Manifestations and Triggering of Coronal Mass Ejections as observed in the EUV-UV emissions”, “2nd China Europe Solar Physics Meeting – CESPM2”, Hvar (Croazia), 07/05/19
- Invited seminar: “Studies of Solar Eruptions from space: entering the new era of multi-channel coronagraphs”, INAF-IAPS Roma, 23/10/19

PUBLICATIONS

List of most important Publications (top 10 as first author; total H-INDEX 19)

- “*Current sheet evolution in the aftermath of a CME event*”, **Bemporad A.**, Poletto G., Suess S.T., Ko Y.-K., Schwadron N.A., Elliott H.A., Raymond J.C., ApJ, 638, 1110, 2006.
- “*Spectroscopic detection of turbulence in post-CME Current Sheets*”, **Bemporad A.**, ApJ, 689, 572, 2008.
- “*First Complete Determination of Plasma Physical Parameters Across a Coronal Mass Ejection-driven Shock*”, **Bemporad A.** & Mancuso S., ApJ, 720, 130, 2010.
- “*A New Variety of Coronal Mass Ejection: Streamer Puffs from Compact Ejective Flares*”, **Bemporad, A.**, Sterling, A. C., Moore, R. L., Poletto, G., ApJ, 635, L189, 2005.
- “*Spectroscopic Signature of Alfvén Waves Damping in a Polar Coronal Hole up to 0.4 Solar Radii*”, **Bemporad A.** & Abbo L., ApJ, 751, Issue 2, article id. 110, 2012.
- “*A Comprehensive Study of the Initiation and Early Evolution of a Coronal Mass Ejection from Ultraviolet and White-Light Data*”, **Bemporad, A.**, Raymond, J., Poletto, G., Romoli, M., ApJ, 655, Issue 1, 576, 2007.
- “*Temporal evolution of a Streamer Complex: Coronal and in situ Plasma Parameters*”, **Bemporad A.**, Poletto G., Suess S.T., Ko Y.-K., Parenti S., Riley P., Romoli M., Zurbuchen T.Z., ApJ, v593, 2003.
- “*Identification of Super- and Subcritical Regions in Shocks Driven by Coronal Mass Ejections*”, **Bemporad, A.**, Mancuso, S., ApJ, 739L, 64, 2011.
- “*Plasma Physical Parameters along Coronal-mass-ejection-driven Shocks. I. Ultraviolet and White-light Observations*”, **Bemporad, A.**, Susino, R., Lapenta, G., ApJ, 784, 102, 2014.
- “*Stereoscopic reconstruction from STEREO/EUV Imagers data of the 3-D Shape and expansion of an Erupting Prominence*”, **Bemporad A.**, ApJ, 701, 298, 2009.

LANGUAGE SKILLS

Mother tongue(s):

English

LISTENING: B2 READING: C1 WRITING: C1

SPOKEN PRODUCTION: B2 SPOKEN INTERACTION: B2

French

LISTENING: C1 READING: C1 WRITING: B2

SPOKEN PRODUCTION: B2 SPOKEN INTERACTION: B2