

# Multi-scale, multi-view and multi-messenger observations of solar eruptions

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The launch of the Solar Orbiter mission in February 2020 heralded a new era in the field of solar physics. The spacecraft is equipped with both remote sensing and in-situ instruments, enabling true multi-messenger observations of the Sun and the solar wind. Integrated on the same spacecraft are all the necessary instruments for a comprehensive sampling of the inner heliosphere, from in situ measurements of solar wind plasma, magnetic fields, waves and energetic particles, as well as remote sensing measurements at unprecedented temporal coverage and spatial resolution of solar radiation spanning from X-ray to extreme ultraviolet.

In particular, one of the payloads, the Metis coronagraph built and operated in Italy, is equipped with two distinct channels, a narrow-band one in the UV H I Ly-alpha line (121.567 nm) and a broad-band in visible-light (580-640 nm range), whose field of view extends from 1.7 to about 9 solar radii varying with the heliocentric distance. The Metis coronagraph can track the evolution of eruptive events and measure plasma properties such as temperature, density distributions, and energy budget. It also enables the analysis of the kinematic state of these events, including their speed, acceleration, and geometry.

In this presentation, we provide an overview of the eruptive events observed not only by the Metis coronagraph and the other instruments aboard the Solar Orbiter –both in-situ and remote-sensing. Additionally, we combine data from ground-based and other space observatories to achieve a 3D perspective and conduct a multi-messenger analysis of these events.

## sessioni congresso

Sole e Sistema solare

**Primary author:** RUSSANO, Giuliana (Istituto Nazionale di Astrofisica (INAF))

**Co-authors:** ANDRETTA, Vincenzo (Istituto Nazionale di Astrofisica (INAF)); LEZZI, Serena Maria (Istituto Nazionale di Astrofisica (INAF)); Dr SAHANI, Preity Sukla (Istituto Nazionale di Astrofisica (INAF)); SASSO, Clementina (Istituto Nazionale di Astrofisica (INAF)); Dr STRAUS, Thomas (Istituto Nazionale di Astrofisica (INAF))

**Presenter:** RUSSANO, Giuliana (Istituto Nazionale di Astrofisica (INAF))

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