



Results from "Eruption Watch" Solar Orbiter coordination campaigns

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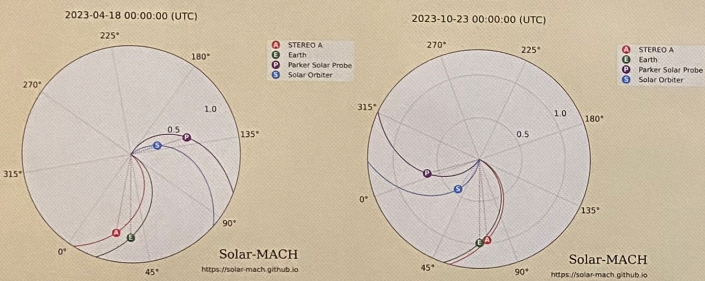
Abstract

We present preliminary results coming from two "Eruption Watch" coordination campaigns, involving all the remote sensing instruments on-board Solar Orbiter, designed to catch eruptive events.

Introduction

During Remote Science Windows, Solar Orbiter (SoI) observations are organized into Solar Orbiter Observing Plans (SOOPs), where a SOOP is a set of common operations from multiple instruments addressing several mission sub-objectives. The Eruption Watch (EW) SOOP is a full-disk, high resolution plan, designed to catch eruptive events. All remote sensing instruments are involved while in-situ payload provides continuous observations.

Up to now, including the current one (7-9 April 2024), we have had nine Eruption Watch campaigns. In this poster we are analyzing some eruptions we observed in two of them, in particular, during the period 17-19 April 2023 (EW1) and 22-24 October 2023 (EW2).

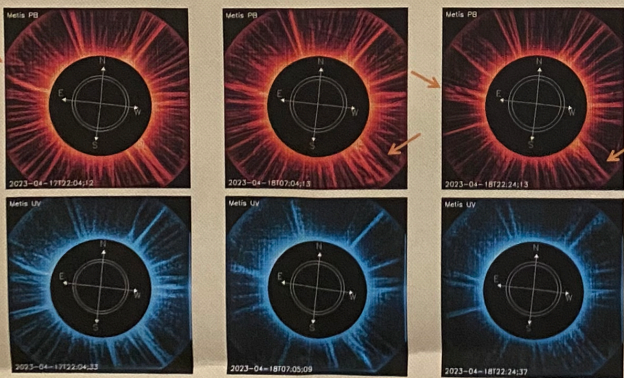


Position of different spacecraft, SoI, STEREO-A, and PSP, and the Earth during the two campaigns (EW1, left and EW2, right).

Eruption Watch Campaign April 2023

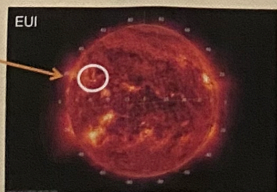
The EW1 campaign was led during the Long Term Planning (LTP) 11 and, precisely, from the 17th 21:30 UTC to the 19th of April 2023 15:10 UTC. During the campaign we could recognize 6 erupting events in the Metis coronagraph images that was observing in both the VL and UV channels, with a cadence of 10 minutes.

Four of these eruptions are shown below. They were all seen in both Metis channels thus meaning that some cold plasma is present, most probably belonging to the erupting prominence, the core of the coronal mass ejection (CME). Regarding the last eruption, shown at the bottom, we were also able to recognize in the Extreme Ultraviolet Imager (EUI) images, the flare from where it was probably originated and, in the Solar Orbiter Heliospheric Imager (SoI) the expansion of the following CME.



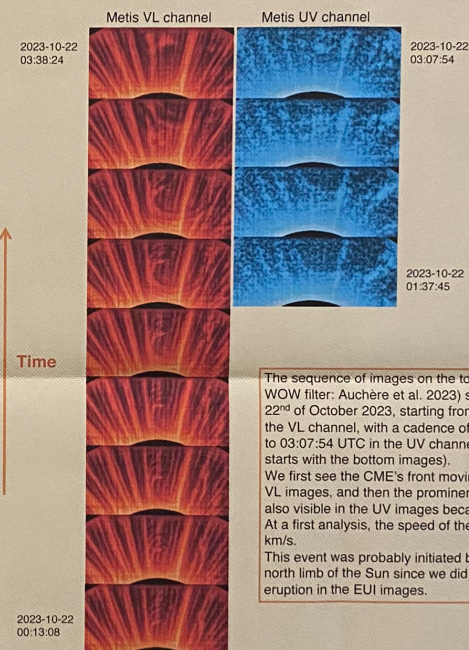
Flare

This event is identified in the Spectrometer Telescope for Imaging X-rays (STIX) Flare List as a C1.4 flare.



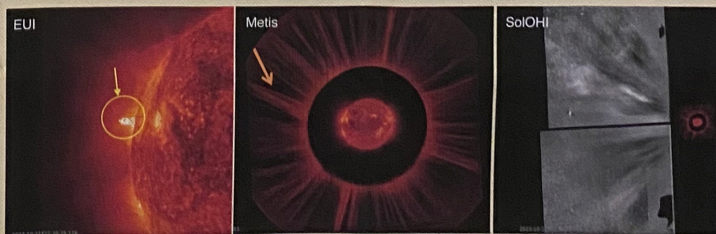
Eruption Watch Campaign October 2023

The EW2 campaign was led during LTP 13 and, precisely, from the 22nd to the 24th of October 2023. During the campaign we could recognize 3 erupting events in the Metis instrument images. Two of these eruptions are shown below. The instrument was observing that was observing in both the VL and UV channels with a cadence of 30 minutes, except in the case of the first event shown below, where the observations were performed at high temporal cadence of 1 minute for one hour.



The sequence of images on the top/left (processed with the WOW filter; Auchère et al. 2023) shows a CME observed on the 22nd of October 2023, starting from 00:13:08 to 03:38:24 UTC in the VL channel, with a cadence of 1 minute, and from 01:37:45 to 03:07:54 UTC in the UV channel (the temporal sequence starts with the bottom images). We first see the CME's front moving rapidly, visible only in the VL images, and then the prominence, which, unlike the front, is also visible in the UV images because it is colder than the front. At a first analysis, the speed of the prominence is around 180 km/s. This event was probably initiated by a flare occurring behind the north limb of the Sun since we did not recognize any flare or eruption in the EUI images.

The second event we are showing was first seen first in the EUI images, on the 21st of October 2023 at around 22:30 UTC. Then, started to appear in the Metis instrument images and then it was finally visible in the SoIHI ones.



The last eruptive event we show was a huge filament eruption seen by Solar Orbiter's EUI and SoIHI instruments on the 22nd of October 2023. The event was first seen first in the EUI images, on the at around 22:30 UTC, and then in the SoIHI ones.

