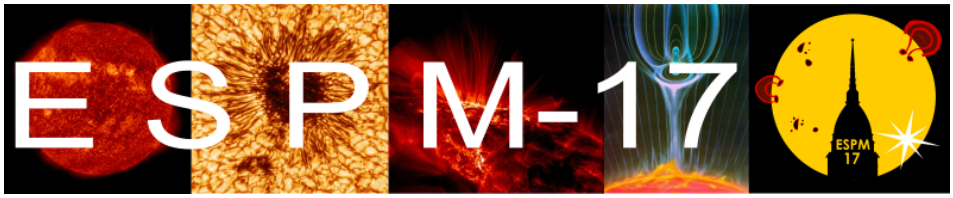

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CME small-scale structures: new insights from white light observations taken between 0.06 – 1 AU

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Parker Solar Probe (PSP) and Solar Orbiter (SO) observe the Sun from unprecedented close-in orbits out of the Sun-Earth line. Due to the highly elliptical orbits of the respective S/C, they cover varying heliocentric distances during their encounters around the Sun. They both provide high-resolution observations of the heliosphere through their white light heliospheric imagers: PSP/WISPR and SO/SoloHI. Using also observations from the HI-1 heliospheric imager onboard STEREO-A (ST-A) at about 1 AU, we catalog a set of events observed simultaneously from at least two of the imagers and highlight their morphological differences when observed from different viewpoints. This allows us to investigate the 3D location, morphology, and evolution of the internal magnetic fine structures in the interiors of CMEs. We derive the three-dimensional information of small-scale magnetic structures for the events on December 8, 2022, and on September 24, 2023. ST-A/HI1 and PSP/WISPR (between 0.11-0.16 AU) observed the former (a filament-related CME) from a similar longitudinal range. Still, they show a different global appearance of the CME, presumably because of the shorter line-of-sight integration of WISPR. For the event on September 24, 2023, WISPR (at 0.18 AU) and SO/SoloHI (at 0.4 AU) were oppositely located in longitude and, though observing the event from different distances, their observations reveal many common features in their FoV. We demonstrate that the CME consists of various morphological groups of fine structures, which can be related back to the Sun, and explore how CME structures appear differently when observed from different viewpoints.

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