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First multi-view observations of an erupting prominence in the UV Lyman-alpha line with SoHO/Metis and ASO-S/LST instruments

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A prominence eruption associated with a limb CME were observed on April 12, 2023 by the multi-channel Metis Coronagraph on-board the Solar Orbiter mission. The prominence, seen in the Metis UV Lyman-alpha images as a very bright and elongated arch propagating southward, is instead much weaker in Metis visible light (VL) images. The elongated arch splits into several blobs and becomes fainter with time as the prominence evolves. In our work, we studied the 3D position of the prominence to understand the reason for such a significant difference between these two channels. By considering the different processes responsible for the emissions, we obtained the time evolution of the electron density and the temperature of one blob of the prominence from VL and UV images, respectively. The derived thermodynamic evolution suggests the existence of unknown physical processes providing additional heating source during the plasma expansion, as also previously found with observations acquired by the UVCS spectrometer on-board SOHO. We also applied the same method to another branch of the prominence to further understand the physical process inside the entire prominence. The Lyman-alpha Solar Telescope (LST) on-board the Advanced Space-based Solar Observatory (ASO-S) mission also observed this eruption along the Earth-Sun view. The solar disk imager (SDI) on-board the LST –observed the prominence lifting from the south-west solar limb, with the south leg fixed onto the Sun as the prominence expand. Another purpose of this work is to combine observations acquired by Metis and SDI to study the prominence from the Lyman-alpha emission. In particular, Carrington maps of chromospheric Lyman-alpha emission measured by SDI will be employed to constrain the radiative component of the Lyman-alpha emitted by the prominence plasma expanding through corona.

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