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## The sheath region of April 2020 magnetic cloud and the associated energetic ions

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Acceleration of energetic particles is a fundamental and ubiquitous mechanism in space and astrophysical plasmas. One of the open questions is the role of the sheath region behind the shock in the acceleration process. We analyze observations by Solar Orbiter, BepiColombo and the L1 spacecraft to explore the structure of a coronal mass ejection (CME)-driven sheath and its relation to enhancements of energetic ions that occurred on April 19-20, 2020. Our detailed analysis of the magnetic field, plasma and particle observations show that the enhancements were related to the Heliospheric Current Sheet crossings related to the reconnecting current sheets in the vicinity of the shock and a mini flux rope that was compressed at the leading edge of the CME ejecta. This study highlights the importance of smaller-scale sheath structures for the energization process. These structures likely formed already closer to the Sun and were swept and compressed from the upstream wind past the shock into the sheath. The upcoming observations by the recent missions (Solar Orbiter, Parker Solar Probe and BepiColombo) provide an excellent opportunity to explore further their role.