Title : Analysis of the solar energetic particle event GLE76

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Abstract :
Solar energetic particles (SEPs) are accelerated during eruptive solar events and can reach energies of several hundred MeV or higher. Their acceleration is commonly associated with solar flares and coronal mass ejections (CMEs), however, the dominant mechanisms and the location of the acceleration regions remain open questions. The most energetic SEP events can produce relativistic particles detectable at ground level by neutron monitors, known as Ground Level Enhancements (GLEs). These events form the high-energy end of the SEP spectrum and provide strong constraints on particle acceleration processes.

GLE76 occurred in November 2024. In this work, we present a detailed analysis of this event, combining in situ particle measurements with remote observations of the associated solar activity. The event is associated with a fast CME and a far-side solar flare. We reconstruct the three-dimensional evolution of the CME-driven shock and examine its expansion in relation to particle acceleration regions and magnetic connectivity to multiple spacecraft distributed around the Sun, including STEREO-A, Solar Orbiter, and near-Earth observers. We further investigate the locations, timing, and temporal evolution of the different solar components and of the shock, as well as the associated type II radio burst as a signature of particle acceleration.