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Survey of Fe-rich SEP events observed by Parker Solar Probe/Integrated Science Investigation of the Sun

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The observed composition of solar energetic particle (SEP) events can be influenced by a number of factors, including the acceleration mechanism, transport effects, and properties of the particle seed population. Generally the abundances of heavy ions relative to oxygen are higher in events where the dominant acceleration mechanism is flare-associated reconnection as compared to events where the particles are primarily accelerated by shocks driven by coronal mass ejections (CMEs). Occasionally, large shock-accelerated SEP events exhibit significant enhancements of ions such as Fe reminiscent of those found in reconnection-related events. Whether these enhancements are a result of the acceleration conditions (e.g., properties of the shock and/or seed population) or a contribution of flare-associated SEPs is still debated. Data from the Integrated Science Investigation of the Sun (ISOIS) on Parker Solar Probe provides a unique opportunity to examine these events at radial distances significantly inside 1 AU. Here we present results from a survey of such Fe-rich SEP events observed by ISOIS and discuss their characteristics in comparison to observations made at 1 AU.

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