

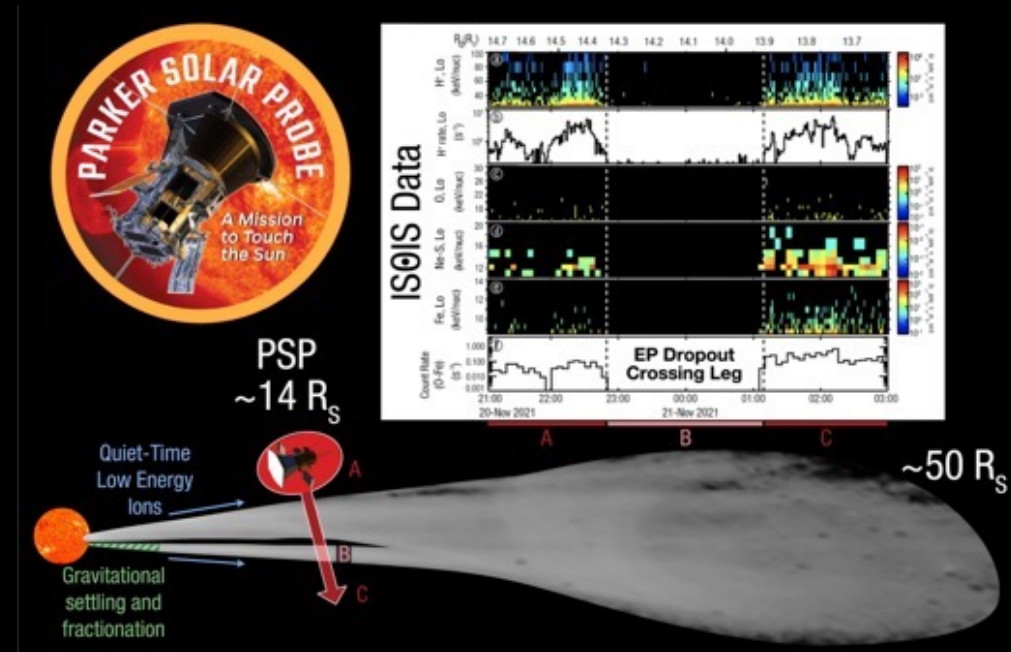
Parker Solar Probe Flies Through the Leg of a Coronal Mass Ejection (CME)

For the first time, a spacecraft, Parker Solar Probe (PSP) has flown through the leg of a CME very close to the Sun (~ 14 solar radii or R_S).

The only major signature in the data over the two hour and twenty-minute crossing was a complete dropout of all the low-energy energetic ions. This was not the case for the higher-energy ions, or particles from the solar wind and the magnetic field, all of which showed no similar dropout.

This means that a sampling of a CME leg close to the Sun is completely different than one sampled as a CME passes 1 AU (location of Earth and STEREOA). A current explanation for the dropout in low-energy energetic ions is the cooling of particles at the base of the CME leg from its rapid expansion when it is first released from the Sun.

These observations show how essential PSP observations are for understanding the near-Sun particle population. This is true for both the basic solar wind as well as transient phenomena such as this CME.



PSP initially descended below the CME's northern leg before ascending above the CME's southern leg and flying through the CME's edge. The inset presents a visual representation of the observed dropout of low-energy energetic ions emanating over the time of the transit (B). Low fluxes of low-energy ions streaming out from the Sun along the neighboring magnetic field (blue) were seen throughout the intervals (A) and (C) that came before and after the event. The front of the CME had already risen to a height of 50 R_S when the PSPs came into contact with it, which had the effect of stretching and straightening the local magnetic field as well as cooling the source ions.