



## **The Relation of Electron Events with EUV Waves Revisited for Solar Cycle 24 Events**

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Thanks to data from the Atmospheric Imaging Assembly (AIA) on the Solar Dynamics Observatory (SDO), we can characterize EUV waves more thoroughly than before. They are correlated with SEP events including electrons, especially with those that show wide longitudinal distributions. We study the onset phase of electron events during solar cycle 24 in comparison with EUV waves observed by AIA and STEREO EUVI. Our interest is whether the EUV wave reaches the footpoint of the field line that connects to the observer (connection point) around the time at which electrons are injected. The connection point is derived by the Parker spiral plus either the PFSS model or Predictive Science's MHD model. In several cases, the wave may never arrive at the connection point, or it may arrive either too early or too late. The distance between the connection point and the wave front is measured along a great circle at the particle injection. We investigate how the 3D structure of the EUV wave (as rendered using STEREO observations) changes the timing relations. We check the consistency of the polarity at the connection point and at 1 AU. Solar wind data are examined to detect disturbances and discontinuities that may alter the Parker spiral. We also discuss how adequate are the input synoptic maps for global magnetic field extrapolations.