



## **Probing the origin of solar energetic particles by combining solar and heliospheric imagery with in-situ measurements from the STEREO spacecraft (Arne Richter Award for Outstanding Young Scientists Lecture)**

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The Solar-Terrestrial Relations Observatory (STEREO), launched in 2006, is equipped with cameras that are observing the Sun and heliosphere from two vantage points. The orbital configuration of the spacecraft reached in 2011-2012 provides an unprecedented opportunity to track the expansion of Coronal Mass Ejections and their associated pressure waves in 3-D. We will present a series of analyses that combine ultraviolet and white-light images obtained by STEREO and the Solar Dynamics Observatory (SDO) to track, in the lower corona, the spatial and temporal evolution of pressure waves associated with the onset of CMEs. We use in-situ measurements of the onset of solar energetic particle events (SEPs) to determine their release time near the Sun. We concentrate on the proton-rich events detected by the near-Earth spacecraft and the STEREOs during 2011 and 2012. We use a simple model of the distribution of interplanetary magnetic field lines to determine the footpoint locations of field lines connecting the lower corona to the points of in-situ measurements. We (1) determine the height and spatial extent of the pressure waves at the SEP release times, (2) compare the longitudinal extent of SEP events with the extent of the pressure waves, (3) compare the kinematic properties of pressure waves launched over widely separated longitudes. We discuss the successes and challenges faced when interpreting these observations in terms of the acceleration of particles at coronal shocks.