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The active Sun and its implication for the heliosphere
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Multi-spacecraft Study of the Kinematics of a Fast Coronal Mass Ejection and its Associated Shock: AIA, SECCHI and LASCO Observations.

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It has been recently shown that CME-driven shocks can be directly observed and quantitatively analyzed from white light images. However, the full tracking of the 3D morphology and kinematics of the CME-shock system requires a set of high cadence observations, both in the inner and outer corona and well-separated viewpoints. We present here the multi-spacecraft analysis of the fast March 7th, 2011 CME (~ 1800 km/s) and its associated shock observed by the AIA/SDO, SECCHI/STEREO and LASCO/SOHO instruments. For the date of the event, the separation between Earth and STEREO A was 87 degrees, and Earth and STEREO B was 85 degrees which gives an ideal configuration for performing this kind of study. Using forward modeling, we find evidence of self-similar expansion of the shock and the CME up to 15 solar radii, but with a clear displacement of the CME leading edge and the shock wave front, that we attribute to the inhomogeneous nature of the background corona. We combine the measurements obtained by the different coronagraphs and EUV telescopes to track back the full impulsive phase to derive the full kinematic profile of the CME-shock from its source region up to 15 solar radii. This unique set of observations will allow us to determine whether the shock is still driven in coronagraph field of view.