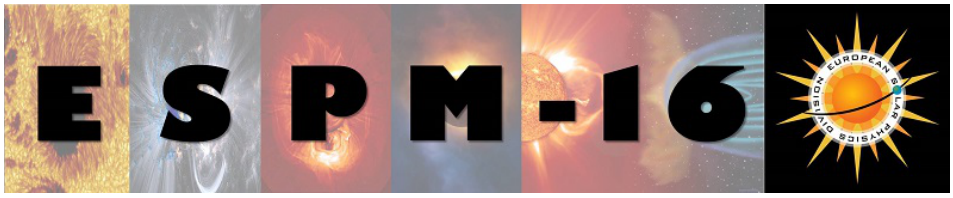

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Source regions of type II radio emission on the surface of an interplanetary shock wave

Monday 6 September 2021 16:22 (13 minutes)

Shock waves driven by Coronal mass ejections (CMEs) can accelerate particles. Radio signatures of electron beams accelerated at the shock front (type II bursts) are produced when the shock wave propagates through the solar atmosphere. Ground-based radio observations allow us to study shock waves in the low corona while space-based radio observations provide us the opportunity to track shock waves in the inner heliosphere.
The preferable location of the type II radio sources on the surface of the shock wave has been a long-discussed question. We address this question in the study of a shock wave associated with a flare/CME event and complex radio event on September 27, 2012. We employ a novel approach, combining the results from the radio triangulation analysis with shock wave modelling.
We first reconstruct the shock wave in 3D space using multi-viewpoint white light observations by SDO and STEREO spacecraft, and then model the evolution of the shock wave using a 3D MHD background coronal model produced by the MAS (Magnetohydrodynamics Around a Sphere Thermodynamic) model.
We first analyze the global evolution of the wave parameters and then localize the areas which could be the source regions of radio emission. We study the temporal evolution of the upstream plasma characteristics and the shock wave parameters. Our results indicate a complex relationship between the different shock wave parameters. However, the shock wave geometry and its relationship with the shock strength seem to play the most important role in the generation of type II radio emission.

Student poster?

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