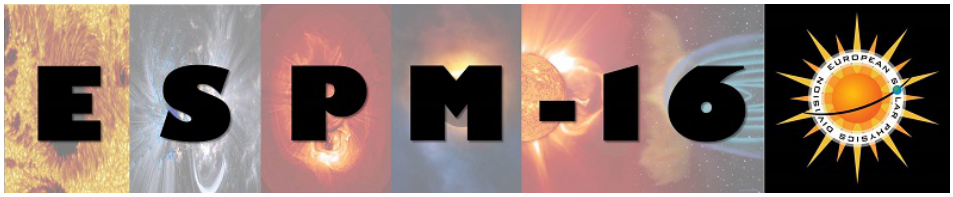

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Three-Dimensional Tomographic Reconstruction and MHD Modeling of the low corona during the last solar minimum

Monday, 6 September 2021 16:48 (13 minutes)

Interest in predicting space weather conditions constantly pushes the advance of state-of-the-art three-dimensional(3D) magnetohydrodynamic (MHD) models of the solar corona and the solar wind, which need to be validated with observational data. Tomography of the solar corona is the only observational technique that can currently provide empirical data of the solar atmosphere in a 3D global fashion. In this work we carry out a validation study of the latest version of the Alfvén Wave Solar atmosphere Model (AWSoM), comparing its results with tomographic reconstructions of physical parameters of the solar corona. For this anlysis, we select rotations from the recent deep minimum of solar activity, between solar cycles 24 and 25, which renews the opportunity to study the Sun-Earth connection under the simplest solar and space environment conditions. Based on narrow band EUV coronal images provided by the SDO/AIA instrument, we carry out tomographic 3D reconstruction of the coronal electron density and temperature in the range of heliocentric heights $r \leq 1.25\ \mathrm{R}_\odot$. Based on polarized visible brightness (pB) coronagraph images provided by the SoHO/LASCO-C2 instrument, we carry out tomographic 3D reconstruction of the coronal electron density in the range of heliocentric heights $\approx 2.5 - 6.0\ \mathrm{R}_\odot$. We compare the MHD model with the tomographic reconstructions in their respective range of heights and discuss the current capability of the AWSoM model to reproduce the reconstructions in specific coronal magnetic structures.

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