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The MHD modelling of streamer waves and its consistency with the observations

The present work investigates solar coronal dynamics, in particular streamer waves. Recent observations combined with advanced numerical tools allow to gain insight into the nature of the coronal streamers and their oscillations. The numerical model for the streamer waves was constructed with the MPI-AMRVAC code in the framework of 2.5D ideal magnetohydrodynamics. We performed a parameter study to identify the sensitivity of the streamer dynamics to the background solar wind speed, spatial characteristics and strength of the excited perturbation and the input parameters for the model such as temperature and magnetic field. This allowed to investigate the theoretical concepts of the streamer waves physics and properties (such as wave mode identification) and to complement the statistical analysis of these events in order to perform streamer seismology. Following the numerical study, in the present work we investigate the consistency of the synthetic and the observational data. To this end, we have developed a tool to compute white light images of simulation snapshots. These are of special interest for the high-resolution white-light images from the METIS (SolO) and WISPR (PSP) instruments, which allow more detailed comparison. The present work aims to investigate the quality of numerical reproduction of the streamer waves phenomena and the prospects of advancing the numerical model based on observations.

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