16th European Solar Physics Meeting

Contribution ID: **456** Type: **Poster**

Settling motions in 1D stratified models of the solar corona

Wednesday, 8 September 2021 09:39 (13 minutes)

We aim at setting and driving 3D magneto-hydrodynamic simulations of the Sun with photospheric magnetogram observations to get a better understanding of the heating mechanism and energy dissipation in the solar corona and thus aiming to move a step closer towards the long-standing solar coronal heating problem. There are already some models that study coronal heating using different heating mechanisms. The working mechanism for our model is the field-line braiding mechanism generating an upward Poynting flux, where plasma motions advect the field. This flux travels as magnetic perturbations into the corona indicating actual magnetic-energy transport. These perturbations can then induce electric currents in the solar corona which are then dissipated due to DC heating. We start the computation with an initial atmospheric stratification that is usually not in hydrodynamic equilibrium. Because settling the initial inequilibrium is costly in large-scale 3D models, instead, we use a 1D model that spans from the solar interior to the corona for finding the numerical equilibrium that exactly fits to the simulation parameters. This new atmospheric stratification we can now use as the initial condition for large simulation runs. Also, we implement and employ an artificial heating function that compensates for a lack of heating in the early phase of the model, where perturbations have not yet reached the corona. We like to start the 3D model with the most realistic physics and less vertical settling motions. This procedure finally allows us to compare our model output with actually observed Doppler shifts in the corona.

Primary author: Ms PANDEY, Vartika (University of Graz)

Co-author: BOURDIN, Philippe-A. (University Graz)

Presenter: Ms PANDEY, Vartika (University of Graz)

Session Classification: Poster Session 5.3

Track Classification: Session 2 - The Solar Atmosphere: Heating, Dynamics and Coupling