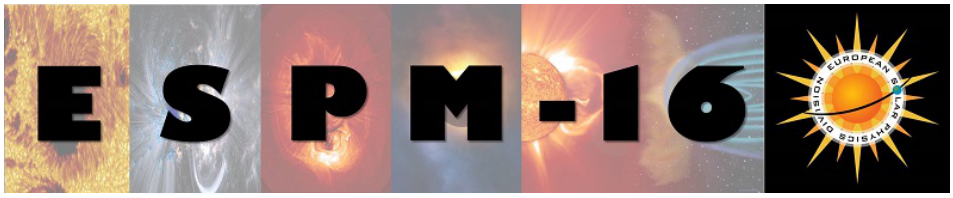

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Modeling the thermal conductivity in the solar atmosphere with the code MANCHA

Wednesday, 8 September 2021 15:18 (13 minutes)

Energy transport through thermal conductivity is an important mechanism in the solar corona. Here we report on the implementation of thermal conductivity into the MANCHA code, which allows its extension to corona. Conductivity is frequently modeled with the expression deduced by Spitzer in the limit of the strong magnetic field which restricts the effects to the corona. However, for an accurate description of the complete solar atmosphere, the thermal conductivity should be modeled through all the layers. We present a numerical study of thermal conductivity effects from the photosphere to the corona. We use the model developed by Braginkii for the electron heat flux for a magnetic field with an arbitrary strength. For completeness, we carry on simulations using the limits of strong magnetic field and weak magnetic field as well. Super-time-stepping scheme is applied to deal with the limitations on the integration time step imposed by the conductivity. The validation of the thermal conductivity implementation is carried out with standard tests in one, two, and three dimensions.

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