Validation of a wave heated 3D MHD coronal-wind model using Polarized Brightness and EUV observations

Susanna Parenti*[1], Victor Reville[2], Allan Sacha Brun[3], Rui F. Pinto[3], Frédéric Auchère[1], Eric Buchlin[1], Barbara Perri[4], and Antoine Strugarek[3]

[1]IAS – CNRS, Université Paris-Saclay – France
[2]IRAP – CNRS, Université Toulouse III – France
[3]CEA – AIM, CEA – France
[4]CmPA, KU Leuven – Belgique

Résumé

The 3D MHD global modeling is a powerful tool to test all the possible candidate physical processes responsible for the formation and evolution of the corona and heliosphere. To fully understand the possible role of each of these mechanisms, we need a validation process where the output from the simulations is quantitatively compared to the observational data. In this work, we present the results from our validation process applied to the wave turbulence driven 3D MHD corona-wind model WindPredict-AW. At this stage of the model development, we focus the work to the coronal regime in quiescent condition. We analyze three simulations results, which differ by the boundary values. We use the 3D distributions of density and temperature, output from the simulations at the time of around the first Parker Solar Probe perihelion (during minimum of the solar activity), to synthesize both extreme ultraviolet (EUV) and white light polarized (WL pB) images to reproduce the observed solar corona. For these tests, we selected AIA 193 A, 211 A and 171 A EUV emissions, MLSO K-Cor and LASCO C2 pB images obtained the 6 and 7 November 2018. We then make quantitative comparisons of the disk and off limb corona. We show that our model is able to produce synthetic images comparable to those of the observed corona.

*Intervenant