

Project Details

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Project Title:

Coronal Models and Applications for LWS

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Summary:

Coronal magnetic field models have numerous applications, from investigating the genesis of CMEs, to predicting the arrival of coronal hole flows and interplanetary magnetic field sector boundaries at the Earth. For many years the potential field, spherical source surface model has provided a widely used tool for research and applications, leading to many insights and products. However, the corona is known to include currents, especially around active regions. Computational tools and capabilities in typical research institutions are now up to the task of using more physically correct approaches. We propose to investigate the capabilities of the publicly available 3D ZEUS code for coronal field modeling, and to test its application using solar magnetograph data as well as idealized photospheric fields for the boundary conditions. The results will be compared with the results for the same boundary conditions from the potential field source surface model, and with published results from other 3D MHD coronal models. A generally available and user-oriented MHD coronal model would possibly represent the next major step in coronal research and its applications. Our plan would be to develop and document the framework for a coronal version of the ZEUS code and the analysis of its results, and to deposit the tested version and framework and analysis codes at the CCMC for others' use. As a complement to this research, we also propose to develop a web-based 'Coronal Weather Report' lesson wherein a person can learn about the connection between the solar surface magnetic field and the appearance of the upper solar atmosphere, the corona, by choosing a photospheric field map and then viewing the coronal field model result.

Publication References:

no references