

Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)

Active Experiments Related to Space Plasmas (C5.1)

THE DUAL-TREE COMPLEX WAVELET TRANSFORM AS A TOOL FOR EXTRACTION OF PLASMA STRUCTURES FROM LASCO IMAGES: PRELIMINARY RESULTS

Vitor Moura, vitormoura21@gmail.com

Instituto Nacional de Pesquisas Espaciais - INPE, SÃO JOSÉ DOS CAMPOS, Brazil

Margarete Oliveira Domingues, margarete.oliveira.domingues@gmail.com

National Institute for Space Research-INPE-Brazil, Sao Jose Dos Campos, Brazil

Aylton Pagamisse, aylton@fct.unesp.br

Universidade Estadual Paulista "Júlio de Mesquita Filho", Presidente Prudente, Brazil

Odim Mendes, odim@dge.inpe.br

INPE, Sao Jose Dos Campos, Brazil

The Large Angle and Spectrometric CORonoghaph on board the Solar Heliospheric Observatory (SOHO) provides images from the hot and magnetized plasma of the solar corona. The faint corona emission and the associated plasma structures (e.g. CMEs) recorded in those images can be used as basis for some insight of the physical scenario in this particular region of the solar atmosphere. In order to characterize the dynamics and morphology of such structures in a better way, it seems crucial that some features of those images should be enhanced. To deal with this need, a new approach using the Dual-Tree Complex Wavelet Transform (DTCWT) was developed. The DTCWT is an improvement of the well-known Discrete Wavelet Transform (DWT) with additional properties of shift invariance, good directional selectivity (for two or higher dimensional signals) and fast algorithm. The multilevel decomposition of an image with the DTCWT generates complex wavelet coefficients, which are manipulated for providing an improvement in the visualization of the plasma structures, highlighting features and helping further analyses. The results of the implemented methodology are promising and it can be used as an auxiliary tool for helping solar physicists in their studies of the magnetized plasma phenomena in solar corona.