Spectropolarimetric synthesis of forbidden lines in MHD models of coronal bright points

E. Alsina Ballester[1,2]

[1] Instituto de Astrofísica de Canarias, E-38205 La Laguna, Tenerife, Spain
[2] Departamento de Astrofísica, Universidad de La Laguna, E-38206 La Laguna, Tenerife, Spain

contact e-mail: *ernest.alsina@iac.es*

The inference of the magnetic field vector from spectropolarimetric observations is essential for understanding the physical processes governing the solar corona. In this talk, we explore which information on the magnetic fields of coronal bright points (CBP) can be obtained from the intensity and polarization of several forbidden lines of interest. We show the results of syntheses with the P-CORONA code, applied to a model of a CBP obtained with the Bifrost MHD code. The enhanced density within the CBP produces an intensity brightening and circular polarization signals close to 0.1% of the intensity, but suppresses the linear polarization. Moreover, we study the impact of the outer coronal material along the line of sight (LoS) by carrying out P-CORONA syntheses for a larger global MHD model. We also apply the weak field approximation (WFA), showing that it provides information on the longitudinal magnetic fields from the strongest-emitting spatial intervals along the LoS, and that it is more reliable in the regions of the CBP where the field does not change sign. Finally, accounting for the time evolution of the CBP model, we find that its signals are slightly attenuated but are still clearly identifiable, and the area where the WFA can be suitably applied remains substantial. We identify the circular polarization of the Fe XIV 5303 Å and especially Fe XIII 10747 Å lines as valuable diagnostics for the magnetic fields in the higher-temperature regions of the CBP. This could be exploited with future coronagraphs with similar capabilities to Cryo-NIRSP/DKIST, but designed to observe below 0.05 solar radii from the base of the corona.