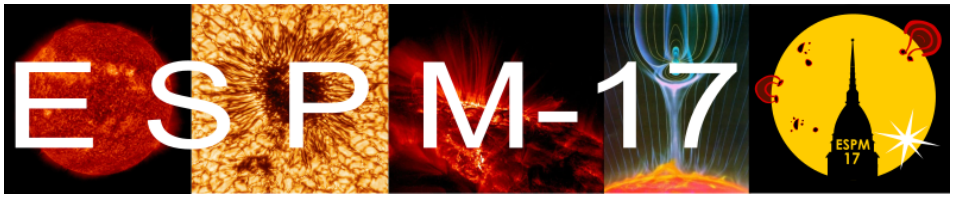

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Exploring EUV coronal diagnostics: the Hanle effect of Ne VIII 770 Å

The Hanle effect refers to the modification of degree of linear polarization and rotation of the plane of polarization of the scattered radiation in the presence of an external magnetic field. In a recent publication, we reported spectral lines in the extreme-ultraviolet (EUV) range that exhibit sensitivity to the unsaturated Hanle effect and are, therefore, inherently sensitive to the vector magnetic field in the solar corona. In our current research, we focus on modeling one such EUV line - Ne VIII 770 Å - and compute the polarization signals induced by resonance scattering. We interpret the modifications in these signals due to collisions and magnetic fields through the Hanle effect. By employing 3D magneto-hydrodynamic models (PSIMAS), we synthesize the polarization maps both on the solar disk and off the limb. The polarization degree (defined as L*I*= sqrt(Q^2+U^2)/I) and the rotation angle of the plane of polarization (defined as Az= (1/2) arctan(U*Q*)) are simulated through the entire solar cycle 24. By FORWARD modeling the polarization of Ne VIII 770 Å, we have explored its potential as a polarimetric diagnostic for the weak coronal magnetic field. Our study demonstrates that this EUV line can be a useful complement to coronal field diagnostics in the FUV, such as O VI 1032 Å and H I 1216 Å, and off-limb spectropolarimetric measurements in the visible and infrared wavelengths, such as those obtained with the Visible Emission Line Coronagraph (VELC), the Upgraded Coronal Multi-Channel Polarimeter (UCoMP) and the Daniel K. Inouye Solar Telescope (DKIST).

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Track Classification: Diagnostic tools and numerical methods in solar physics