

Detection of the Hanle and Zeeman Effects in $H\alpha$ and He I D3 of the Solar Spicules using Polarization-holographic Imaging Stokes Polarimeter

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Abstract

We report the results of Spectropolarimetric observations of Spicules in $H\alpha$ and He I D3 obtained in the Abastumani Astrophysical Observatory using an innovative polarization-holographic Stokes imaging polarimeter. The observations were made on the 53 cm non-eclipsing coronagraph and its spectrograph with spectral dispersion of 0.96 \AA/mm in the second order of grating.

The great attention were paid to the polarimetric calibration of the instrumental setup and further data reduction of observational material.

The observational Stokes profiles show clear evidence of magnetic field induced Hanle and Zeeman effects. We estimate the magnetic field strength to have about 40G in the observed solar spicules.

Our results show that the Polarization-holographic Imaging Stokes Polarimeter has excellent potential for the solar spectropolarimetric observations and its sensitivity and accuracy could be substantially increased in case of improvement of seeing of the coronagraph and the use of the fast readout rate CCDs