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Hanle effect in C_2 lines of the Solar spectrum: an inversion procedure for weak magnetic field measurement

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In this paper we perform a self-consistent NLTE modeling of the scattering polarization in C_2 molecular lines of the solar spectrum. We use semi-empirical 1-D solar models and account for sphericity in order to be able to interpret observations made close to the limb. From the set of THEMIS observations, performed at various limb distances, we perform a two-parameter inversion, by incorporating our NLTE code in a simplex minimization procedure, in order to find microturbulent magnetic field at the line-forming height, as well as depolarizing collision cross-section. By relating different limb distances to different line-forming heights through contribution function analysis, we are able to give a rough estimation of the turbulent magnetic field strength dependence on height. We find that the strength of the magnetic field decreases from ≈ 30 Gauss to ≈ 10 Gauss in the altitude range from 200 to 400 km above the base of the photosphere.