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Emission polarization in FeI 630nm at the extreme limb of the Sun

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Abstract. Spectro-polarimetric observations with the SOT instrument on-board *Hinode* revealed the emission spectrum of the Fe I 630 nm lines at the solar limb. The emission shell extends for less than $1''$, and therefore it can only be observed from space at this time. The linear polarization signal is clearly due to scattering and it is predominantly oriented in the radial direction. The upper level of the 630.2 nm line has total angular momentum $J = 0$, hence this line's polarization is entirely due to dichroism. Using a comprehensive atomic model of iron we are able to interpret qualitatively the observed signals. The Hanle effect makes the linear polarization of the Fe I 630 nm lines sensitive to magnetic fields between ~ 0.1 G and ~ 40 G, and to the field's topology for stronger fields. The discovery of their scattering polarization signals thus opens a new diagnostic opportunity for these lines.