

POLARISATION OF AURORAL RED LINE IN THE EARTH'S UPPER ATMOSPHERE: A REVIEW

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Polarisation of light is a key observable to provide information about asymmetry or anisotropy within a radiative source. Polarimetry of auroral emission lines in the Earth's upper atmosphere has been overlooked for decades. However, the bright red auroral line (λ 6300Å) produced by collisional impact with electrons precipitating along magnetic field lines is a good candidate to search for polarisation. This problem was investigated recently by Lilensten et al (2006) and observations were obtained by Lilensten et al (2008), Barthélemy et al (2011) and Lilensten et al (2012) with a photopolarimeter. Analysis of the data indicates that the red auroral emission line is polarised at a level of a few percents. The results are compared to theoretical predictions of Bommier et al (2011) that were obtained for a directive impact. The comparison suggests the existence of depolarization due to the beam anisotropy loss by interaction with the ionosphere. The modeling is in progress. A new dedicated spectropolarimeter currently under development will also be presented. This instrument will cover the optical spectrum from approximately 400 to 700 nm providing simultaneously the polarisation of the red line and of other interesting auroral emission lines such as N_2^+ 1NG (λ 4278Å), other N_2 bands, etc. . . The importance of these polarisation measurements in the context of atmospheric modelling and geomagnetic activity will be discussed.