

## Possible evidence for partial demagnetization of electrons in the auroral E-region plasma during electron gas heating

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**Abstract.** A previous study, based on incoherent and coherent radar measurements, suggested that during auroral E-region electron heating conditions, the electron flow in the auroral electrojet undergoes a systematic counterclockwise rotation of several degrees relative to the  $\mathbf{E} \times \mathbf{B}$  direction. The observational evidence is re-examined here in the light of theoretical predictions concerning E-region electron demagnetization caused by enhanced anomalous cross-field diffusion during strongly-driven Farley-Buneman instability. It is shown that the observations are in good agreement with this theory. This apparently endorses the concept of wave-induced diffusion and anomalous electron collision frequency, and consequently electron demagnetization, under circumstances of strong heating of the electron gas in the auroral electrojet plasma. We recognize, however, that the evidence for electron demagnetization presented in this report cannot be regarded as definitive because it is based on a limited set of data. More experimental research in this direction is thus needed.

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