

Low electron temperature region around the dayside cusp observed with ESR

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We found some ESR observations indicating extremely low electron temperatures with electron density enhancement in the dayside region. We investigated this low electron temperature region using ESR CP-2 mode observations. We suggest that the low electron temperature is due to increased heat capacity of the electron gas with higher density and a stronger coupling to relatively cold ions.

The signature including high electron temperatures with some F region electron density enhancement is well known as a cusp signature. However we found some ESR observations indicating extremely low electron temperatures with electron density enhancement in the dayside region. We investigated this low electron temperature region using ESR CP-2 mode observations, which is designed to provide spatial structures and also enable to derive electric fields or plasma drifts from a rapid transmitter antenna scan. We suggest that the low electron temperature is due to increased heat capacity of the electron gas with higher density and a stronger coupling to relatively cold ions.