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The mystery of black auroras

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Abstract content
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Black auroras are recognized as spatially well-defined regions within quasi-uniform diffuse auroral background where the optical emission is significantly reduced. This phenomenon remains a mystery, as the underlying mechanism is still unknown.

Multi-wavelength optical data will be combined with incoherent scatter radar data to determine the characteristic energy of the precipitating particles both inside and outside black auroras.

EISCAT is the world's most sophisticated incoherent scatter radar system. The radars observe electron density, ion and electron temperature, and ion velocity. From these parameters, a wide range of geophysical phenomena can be studied in the ionosphere.

Black aurora events are analysed using two cameras simultaneously with different optical filters for the first time. 427.8/844.6 nm corresponds to higher/lower energy precipitating electrons. The ratio of these wavelengths gives the characteristic precipitating electron energy. Images of the wavelength ratio, corresponding to electron energy, will be shown from inside and outside the black auroras. Data from the EISCAT radar site in Tromsø, Norway, is presented.

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