# Comparison between observation and model calculation on auroral oxygen ion emission

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We are conducting observation of auroral OII732/733nm emission using an auroral spectrograph (ASG) developed by NIPR and installed at Longyearbyen, Spitzbergen. Observation of aurora spectra with a field of view of 180 degree along a magnetic meridian, a wavelength coverage of 477-766nm, and spectral resolution of 2nm is possible using the ASG. We have presented so far the occurrence and intensity distribution of the oxygen ion emission with respect to magnetic local time, and the relation between ionospheric parameters obtained by ESR and the oxygen ion emission. In this presentation, we will present results of comparison between spectral observation of auroral emission lines including the oxygen ion emission and calculated aurora emission.

Calculation of auroral line emissions is based on a two-stream approximation electron transport equation. The calculation gives volume emission rates of OI558nm, OI630nm, and OII732/733nm emissions with the characteristic energy and the energy flux as input parameters. From emission intensity ratios and absolute emission intensities of each auroral emission at magnetic zenith obtained from aurora spectral observation at 0756UT on December 8, 2000 with the ASG, we could infer a characteristic energy of 350 eV and an energy flux of 1.9 erg/cm2/sec, respectively. Agreement between observation and calculation in this case was very good. In addition, calculation showed that a peak altitude of the oxygen ion emission is higher than that of the OI630nm emission in F region. This result also agreed with observation. These results confirm that the auroral oxygen ion emission is produced by direct ionization and excitation of oxygen atoms by soft electrons.