SCATTERING CROSS SECTION OF THE RELATIVISTIC ELECTRONS AT ATMOSPHERE

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The possible relativistic effects on the scattering cross section of the high energy electrons at atmosphere are investigated. We considered a bulk of electrons with a high centre of mass (CM) velocity at finite temperature. The observer at the bulk's centre of mass, measure different values for frequency (Doppler effect) and fields (E, H) intensity. At low velocities, one can measure just the changes in frequency, but at high velocities, the changes in electromagnetic fields also are measurable.

Because of radar cross section (RCS) depends on both frequency and polarisation, one can measure the relativistic effects as the changes in the monostatic or multi- static RCS of the relativistic electrons.

Here we have focused on the size estimation of the relativistic electrons, and our results show how the size estimation may change by changing the frequency and the CM velocity of bulk electrons.

At low velocity and long wavelength regions, the perturbation expansion is used for scattering cross section. Our results show that relativistic effects, increase the volume estimation of the atmospheric precipitation.

As a future study plan, we propose to develop a Monte Carlo code based on the *Thomson scattering* process, to simulate the scattering cross section at different altitudes.

The ratio between relativistic and non-relativistic volume estimation ($V_{rel}/V_{non-rel}$) versus (KR) based on Rayleigh approximation.