Title: Motion of Charged Particle in Space-Plasma Environment

Presented by: Ayushi Srivastava (JRF)

Abstract: We know that Sun is a ball of hot plasma, which continuously emits energetic charged particles in the form of solar wind (200-800 km/s). These charged particles are deflected by the Earth's magnetic field but some of these particles can enter the Earth's magnetosphere from Polar regions, where magnetic field lines are open and also from magnetotail region through the process of reconnection. These particles get trapped in the geomagnetic field lines and perform three motions: Gyro Motion, Bounce Motion, and Drift Motion. During their trajectory they can interact with different plasma waves and get accelerated/decelerated to higher/lower energies. The Earth's Radiation belts (inner and outer) are the regions, where MeV range charge particles are observed. These MeV range electrons are hazardous to our satellite and spacecraft. Therefore, it is important to understand dynamics of charged particle trapped in the Earth's magnetosphere. We have considered a simple dipolar magnetic field to incorporate geomagnetic field in the simulation. We have performed test particle simulation to visualize the particle trajectory in the Earth's magnetic field. For this purpose, we considered proton of 5 Mev at L-shell 4 with pitch angle of 30°. We used Runge-Kutta Method of order six in our simulation. Some of the results from this study will be presented.

References-

[1] Soni P., B. Kakad and A. Kakad, Simulation study of motion of charged particles trapped in
Earth's magnetosphere, ASR, 2020.