Title: Exploring Jupiter: A Gas Giant

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Abstract: Jupiter is the biggest planet having the largest magnetosphere in our solar system. Jupiter's magnetosphere creates a complex and dynamic plasma environment around the planet. It has one of the strongest radiation belts in the solar system surrounded by energetic charged particles. Radiation belts are the regions, where the magnetic field of the planet is nearly dipolar and is responsible for the trapping of energetic charged particles. Jupiter's radiation belts consist of negatively charged electrons and positively charged ions (proton, oxygen, and sulfur), even ultra-relativistic GeV protons get trapped near the planet. These highly energetic charged particles which are trapped in radiation belts perform three types of quasi-periodic motions (i.e. gyration, bounce, and drift) around the planet. The study of energetic charged particles in the radiation belt can provide information about the physical processes that cause particle energization. These radiation belt particles are important as they can directly affect spacecrafts and their instruments. In this context, test particle simulation is performed to study the dynamics of the charged particle in the radiation belt of the Jovian magnetosphere. Some of the information regarding planet's magnetic field and charged particle trajectories will be discussed.