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Article

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Lorentz resonances and the structure of the Jovian ring

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Charged dust orbiting through spatially periodic planetary magnetic fields will experience time-variable electromagnetic forces. When the forcing frequencies are nearly commensurate with the particle's orbital frequency, the particle undergoes large out-of-plane and radial excursions. Specific 'Lorentz' resonances, corresponding to particular spatial periodicities in the magnetic field, occur on either side of synchronous orbit. We describe here Lorentz resonance locations and strengths for the jovian and saturnian rings. The boundaries of the halo of the jovian ring, and perhaps other ring structure, are near resonances.

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