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Dynamics in Saturn's F Ring: Orbits of Charged Grains LORIN MATTHEWS, MEIHONG SUN, GINGER BRYNGELSON, TRUELL HYDE, CASPER, Baylor University, PO Box 97310, Waco, TX 76798-7310 — The dynamics of Saturn's F Ring have been a matter of curiosity ever since the probes Pioneer 11 and Voyagers 1 and 2 sent back data revealing the ring's unusual features, and are once again of interest as Cassini reached its destination. The F Ring displays clumps, kinks, waves and braids, structures which evolve on the time scale of months. Several models have been proposed to explain these features; most of these invoke perturbations caused by the shepherding moons or km sized moonlets imbedded in the ring and are purely gravitational in nature. These models assume that both the plasma densities at the F Ring and the charges on the grains are small enough that electromagnetic forces can be ignored. This study shows that such electromagnetic forces can lead to significant perturbations of the orbits of micron sized grains, even for very small grain charges, and are also of importance in explaining the observed structure of the F Ring.

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