

Abstract Submitted
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Simulation of Dust Charging and Shielding in the Presence of a Magnetic Field CHRIS FICHTL, University of New Mexico, GIAN LUCA DELZANNO, LANL, GIOVANNI LAPENTA, LANL — We explore the charging of a dust particle immersed in a plasma in the presence of a magnetic field. The dust particle charges due to the flowing electrons and ions within the plasma and is allowed to emit electrons via thermionic emission and photoemission. Several parameters are obtained and compared with basic simulations without the magnetic field using the 2-D, 3-V DEMOCRITUS code developed at LANL. Next we look at the effect of this dust particle charging in the presence of another dust particle. Delzanno, et al. [1] showed that for a thermionically emitting particle immersed in a plasma, an attractive potential well can form. This leads to the attraction of particles with like charges, such as another dust grain. We explore the attractive forces between two particles as a function of their separation. If the attractive potential well is deep enough, the two particles will combine, thereby creating macro-particles. We study this in an astrophysical sense, looking at this phenomenon as a possible source of galactic formation.

[1] G.L. Delzanno, G. Lapenta, and M. Rosenberg, Phys. Rev. Lett. 92 (3), 035002 (2004)

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