Abstract Submitted
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Coagulation of fractal aggregates in Lorentzian space plasma with ultraviolet radiation LORIN MATTHEWS, VICTOR LAND, TRUELL HYDE, Center for Astrophysics, Space Physics & Engineering Research, Baylor University, One Bear Place #97310, Waco, TX 76798-7310, ALLISON YOUNGBLOOD[1] — Coagulation of dust particles occurs in many plasma environments and is especially important for the early stages of planet formation. Particles present in tenuous plasma around young stellar objects are likely to obtain a negative charge, which would hinder coagulation through the repulsive Coulomb interaction. However, due to the fractal nature of the particles, dipole moments arise, which promote coagulation. Both the charge and dipole moments depend on the energy distribution of the ambient plasma. In space, Lorentzian distributions are observed, with a large contribution of high energy particles. Furthermore, ultraviolet (UV) radiation from the young star causes photo-detachment, affecting the charge and dipole moments of the dust, and possibly the coagulation. We use a charging model based on a modified orbital-motion-limited theory, including the effect of Lorentzian plasma distributions and UV radiation, to calculate the charge and dipole moments on fractal aggregates. With a self-consistent N-body code, which includes the dipole-dipole interactions, we then model the coagulation of these aggregates.

[1]Participant in CASPER's REU program

Lorin Matthews
Center for Astrophysics, Space Physics & Engineering Research,
Baylor University, One Bear Place #97310, Waco, TX 76798-7310

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