Modeling of Coulombic Adhesive forces on a Charged Particle Near a Grounded, Conducting Plane

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Abstract—Adhesion and dispersion of self-charging particles is a safety concern in potential Tokamak reactors. The coulombic adhesive force of a charged particle on a conductive surface is modeled using Poisson's equation in COMSOL Multiphysics for particles between 1 and 100 microns in diameter, and of permittivities between 1 and 10^9. The effects of particle size, shape, and surface roughness are shown. The upper limit of the Coulombic force is compared against the theoretical VDW force.