Modeling and Experimental Investigations of Force Balance between Particle Adhesion and Repulsion involved in Electrodynamic Screen Operation

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***Abstract*— The movement of particles across the surface of an Electrodynamic Screen (EDS) is motivated by many forces, such as the Coulomb force, the dielectrophoretic force, particle adhesion, friction, drag, etc. The theoretical nature of this motion has long been proposed and ideal behavior described, originally by Masuda et al. In practice, however, particle motion appears to be much less predictable, and is highly parameterized on both properties of the particles involved (size and charge) and the design of the EDS itself (electrode spacing, operating voltage and frequency). We have developed a simulation program that models the relevant forces on a single particle to assist in the statistical classification of different types of particle motion across the EDS as a function of these parameters. Results of this analysis are compared to experimental results using a prototype EDS, and will be used to propose optimal sets of design parameters for future EDS design and operation.**