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# A Model for the Non-uniform Contact Charging of Particles

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## Abstract

If a particle is in contact with another solid electric charge may be exchanged. Previous experimental observations clearly prove that the amount of exchanged charge does not only depend on the charge carried by the particle prior to the contact but also on its local distribution on the particles surface. However, most existing modeling approaches utilize the assumption of a uniformly charged particle. In the present paper we propose a new model which accurately accounts for the charge distribution on the particles surface during particle-wall and inter-particle collisions. Further, the results obtained with the new model are compared to data of single particle charging experiments. Moreover, we implemented the model in a Computational Fluid Dynamics (CFD) simulation of powder pneumatically transported in a pipe. We show that the charging behavior of the powder is quantitatively and qualitatively different if a non-uniform charge distribution is taken into account.

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