

A new experimental apparatus for single-contact particle-particle charge transfer

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Abstract:

Particle-particle charge transfer experiments are challenging due to the difficulty in handling, and creating single-contact collisions between, two sub-millimeter, high-speed particles. We propose a novel apparatus that overcomes this difficulty by combining acoustic levitation and pneumatic conveying to create a controlled collision between two particles.

Our apparatus uses acoustic levitation to keep one particle stationary while pneumatically propelling the other, ensuring (1) an electrically and physically isolated collision with a high collision success rate and (2) precise control and measurement of the pre-collision charge of the particles. Further, the post-collision charge of the particles is measured to determine the charge transferred during the collision.

By successfully addressing the experimental difficulty, our apparatus can efficiently generate large datasets, providing statistics for the development of particle-particle charging models.

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Solid and Powders

Oral

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