

MEASUREMENT OF DUST GRAIN CHARGE
IN A WEAKLY IONIZED PLASMA
OF A DC DISCHARGE

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S u m m a r y

The charge of dust particles is determined experimentally in a bulk dc discharge plasma in the pressure range 20–150 Pa. The charge is obtained by two independent methods: One is based on an analysis of the particle motion in a stable particle flow and another on an analysis of the transition of the flow to an unstable regime. Molecular dynamics simulations of the particle charging under conditions similar to those of the experiment are also performed. The results of both experimental methods and the simulations demonstrate good agreement. The charge obtained is several times smaller than predicted by the collisionless orbital motion theory, and thus the results serve as an experimental indication that ion-neutral collisions significantly affect the particle charging.