

Dense plasma jets used in dusty plasma experiments

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A coaxial plasma gun has been successfully used to accelerate dust particles at hypervelocity [1], to operate as a useful tool for cleaning various surfaces covered with dust [2-3], or to produce dense plasma jets for testing fusion materials [4]. In our recent experiments we studied the interaction between a pulsed plasma jet ejected from a coaxial gun and a dust crystal produced in a radio-frequency plasma. The essential feature of our new experiments is the passing of the plasma jet through a thin slit or through small holes to get a thin layer of plasma or a “multi-jet” to interact with just one layer of the crystal. The coaxial plasma gun was powered by a capacitor charged up at 2 kV. The ejected plasma had a speed of a few km s⁻¹, a peak electron temperature of ~10 eV, and peak electron density of ~10²¹ m⁻³. Interesting phenomena such as dust particle acceleration, particle oscillations and dusty plasma instabilities were observed.

References:

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