

## USING DUST PARTICLES AS PROBES IN LOW PRESSURE GAS DISCHARGES

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**Abstract.** Conventional plasma diagnostic techniques can be classified as either invasive or non-invasive. Invasive techniques provide information about multiple local plasma parameters, whereas non-invasive techniques are typically optical and have limited spatial resolution. The primary disadvantage of invasive techniques is that the presence of the probe alters the plasma parameters that are intended to be measured, resulting in a systematic error in the results. One way to minimize the disturbance is achieved by reducing the size of the probe. A practical limit is the use of a single micrometer-sized solid grain, often referred to as a dust particle. A dust particle in plasma interacts with the electrons and ions and acquires a significant electric charge, as a result of which it can respond to the variations of the electric field in the discharge. By tracing the trajectory of the particle and deriving the acceleration, one can map the net force distribution along its trajectory. By introducing a precisely regulated external force, it is possible to set the initial conditions of the particle's motion in order to maximize the volume traversed by the particle.

In the presentation I will introduce the concept in detail and show examples based on works of several research groups including recent results from our own laboratory.

### References

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