

**ELECTRIC FIELD MEASUREMENTS IN THE
SHEATH OF AN ARGON RF DISCHARGE BY
PROBING WITH MICROPARTICLES UNDER
VARYING GRAVITY CONDITIONS**

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The electric field profile in the plasma sheath of an argon rf plasma has been determined by measuring the equilibrium height and the resonance frequency of plasma-confined microparticles. In order to determine the electric field structure at any position in the plasma sheath without the discharge being changed or disturbed an additional, non-electric, force is introduced which does not alter the plasma conditions, but which does allow for manipulation of the particle position through the sheath: (hyper-)gravity, induced by a centrifuge. Consequently, the electric field and the particle charge can be determined as function of the position in the sheath, using one and the same particle for measurements at several positions throughout the sheath. Particle charges between 6000 and 7000 times the electron charge are determined. Closer to the electrode, an increase of the particle charge is observed. Over the largest part of the sheath the electric field is linear, while close to the sheath edge its behaviour appears to be non-linear. Absolute values of the electric field at the electrode (-25.000V/m) are consistent with literature [1].

1. Basner R et al, 2009 *New J. Phys.* **11** 013041.