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Dust particle charge and screening in the collisional RF plasma sheath JOB BECKERS, DIRK TRIENEKENS, GERRIT KROESEN, Eindhoven University of Technology, ELEMENTARY PROCESSES IN GAS DISCHARGES TEAM — Once immersed in plasma, a dust particle gathers a highly negative charge due to the net collection of free electrons. In most plasma's on earth and with particle sizes is in the micrometer range, the gravitational force is dominant and consequently the particle ends up within the plasma sheath region where it is confined due to balancing gravitational and electrical forces. In the plasma sheath region, the Orbital Motion Limited theory predicts charge values that significantly deviate from reality. This is due electron depletion and due the large directed drift velocity of ions, complexifying the prediction of the particle's charge dramatically. We have developed a novel method to measure the charge of a microparticle (10 μm in diameter and confined in a flat potential well above an RF powered electrode) by studying the horizontal interaction with another particle (equally in size) when the angle of the flat part of the potential well is varied with respect to the earth's horizontal plane. Measured particle charges are within the error bars of earlier measurements of the charge of the same particles and comparable plasma conditions during experiments under hyper-gravity conditions in a centrifuge.

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