

Abstract Submitted  
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**Charging and shielding of a non-spherical object in a plasma** LEI ZHAO, GIAN LUCA DELZANNO, LANL — We study the charging and shielding of a non-spherical object immersed in a Maxwellian plasma at rest. We consider prolate ellipsoids, varying parametrically the aspect ratio while keeping the surface area constant. The study is conducted with CPIC [1], a newly developed Particle-In-Cell code in curvilinear geometry that conforms to objects of arbitrary shape. For a plasma with temperature ratio equal to unity and for an object with characteristic size of the order of the Debye length, it is shown that the floating potential has a very weak dependence on the geometry, while the charge on the object increases by a factor of three when the aspect ratio changes from one (a sphere) to hundred (a needle-like ellipsoid). This indicates that the screening length depends on the geometry. Scaling studies of the dependence of the charging time and screening length on the aspect ratio and plasma conditions are presented, including theoretical considerations to support the numerical results.

[1] G.L. Delzanno, et al, “CPIC: a curvilinear Particle-In-Cell code for plasma-material interaction studies,” under review.

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