

Abstract Submitted  
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**The potential of an emissive dust-grain**<sup>1</sup> AMNON FRUCHTMAN, GENNADY MAKRINICH, H.I.T.-Holon Institute of Technology — The potential of a spherical dust-grain that emits electrons is calculated. A photoelectric emission is assumed so that there are three types of particles: plasma ions, plasma electrons, and emitted electrons. The ions are assumed collisionless in their motion towards the dust-grain. The energy and angular momentum of the ions in the bulk plasma are assumed zero, so that orbital motion effects are neglected. For a small Debye number (the ratio of the Debye length to the dust-grain radius), we perform a two-scale analysis to determine the potential of the grain relative to the plasma and the fluxes of the various particles. At space charge saturation, we derive approximate analytical expressions for the potential and the fluxes. For a finite Debye number, numerical solutions show that the grain potential comes closer to the plasma potential. We then allow charge - exchange collisions for the ions during their motion towards the grain. It is shown that these collisions increase the potential drop in the presheath, so that the grain potential becomes more negative relative to the plasma.

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