

Abstract Submitted
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Ion Sheath Formation in an Inductively-Coupled Plasma Mass Spectrometer¹ JOSEPH CHANDLER, Brigham Young University — Between the skimmer cone and the mass analyzer of an Inductively Coupled Plasma Mass Spectrometer (ICP-MS) lies an electrostatic ion lens. The lens uses a large negative potential to remove the electrons from the plasma and to collimate the ions of the weakly ionized plasma, forming a plasma sheath. By using Boltzmann electrons and collisionless ions to computationally model this interaction, we can calculate the electrostatic potential and ion density near the skimmer cone. Doing this calculation on a cylindrically symmetric grid gives a version of Poisson's equation which is a second order nonlinear differential equation that can be solved using SOR. In this plasma sheath calculation, no pre-sheath is required due to the supersonic velocities of the ions. By calculating the position of the plasma sheath based on different initial conditions we are developing an understanding of how and where this sheath forms.

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