

Abstract Submitted  
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**Electron Collisions and Ionization of Argon Gas in the Inductively Coupled Plasma Mass Spectrometer**<sup>1</sup> CARSON EVANS, ROSS SPENCER, Brigham Young Univ - Provo — The plasma torch of the Inductively Coupled Plasma Mass Spectrometer (ICP) is powered by a 3-turn coil attached to a radio-frequency generator running at 40 MHz. The discharge is started by a Tesla coil that briefly ionizes a small fraction of the argon gas flowing through the coil. After the initial ionization pulse, the RF field produces the electric field that gives the electrons enough energy to heat the argon gas. As the electrons gain energy from the RF field they reach an energy capable of either exciting or ionizing the argon atoms. We are modeling the effect of the RF field on the electrons as well as the effect of collisions between electrons with neutral, excited, and ionized argon and with other electrons. We are also including the possibility of de-excitation argon. Our goal is to see an electron avalanche, a chain reaction where electrons ionizing argon neutrals create more free electrons which in turn ionize more argon.

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