Abstract: Electron capture to ions is of central importance for the physics of all collisions. This is especially true for astrophysical plasmas, as the vast majority of atomic matter in the universe consists of ions and electrons. These capture processes often result in the emission of radiation, either directly or through associated excitation and relaxation of bound electrons in the ion. Two specific capture processes will be presented that were observed at separate laboratories. One of these laboratories is at WMU and the other is at the Jagiellonian University in Krakow, Poland where I spent the past year doing research.

The tandem van de Graaff accelerator at WMU is a device capable of low- to mid-Z, medium-energy acceleration. Single photon emission accompanying two-electron capture can be considered the time inverse of double photoionization, a process sparsely studied for two electron systems other than helium, and was proposed theoretically over 30 years ago. This process is referred to as radiative double electron capture (RDEC) and has now been observed for the first time in gas targets at WMU using F^{9+} and F^{8+} swift projectiles and coincidence timing techniques.

More recently (in the last 30 years), electron beam ion traps (EBITs) have been used to create and manipulate ions. The EBIT at Jagiellonian University is a compact, room-temperature device capable of creating fully-stripped argon, the species of interest in the work presented, as well as other ions. The detection of emitted radiation allows the exploration of plasma dynamics within the trap, with attention given to charge-state distribution and evolution. During the time spent at JU, evidence was found for high-order resonances, specifically trielectronic recombination, in the plasma using electron beams beyond the dielectronic recombination limit.

Parking: Metered parking is available in Parking Structure #2, near Miller Auditorium.
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