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Modeling Evaporative Electron Cooling in an Ultracold Neutral Plasma[1] CRAIG WITTE, JACOB ROBERTS, Colorado State University — Ultracold plasmas (UCPs) are formed by photoionizing a collection of laser cooled atoms. Once formed, these plasmas expand, cooling over the course of their expansion. In theory, further cooling should be obtainable by forcibly inducing electron evaporation by applying DC electric fields to extract electrons. However, this cooling is difficult to quantify experimentally. Any attempt to obtain such a measurement requires a firm knowledge of evaporation dynamics in the system. For UCPs, electron mean free paths are smaller than the width of the plasma, resulting in significant transport effects that are not included in standard evaporation treatments. We have developed a simple Monte Carlo model that incorporates these effects. This talk will discuss this model, and how it can be utilized to measure evaporation and cooling in UCPs.

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