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Coulomb Expansion of Cold Non-Neutral Rubidium Plasma MICHAEL VIRAY, STEPHANIE MILLER[1], GEORG RAITHEL, Univ of Michigan - Ann Arbor — We study the expansion of a cold, non-neutral ion plasma into the vacuum. The plasma is made from cold rubidium atoms in a magneto-optical trap (MOT) and is formed via ultraviolet photoionization. We observe the development of both shock shells and ion pair correlations in the plasma as it expands. We also present two different computer simulations of the plasma expansion (a particle trajectory model and a fluid model) that recreate experimental conditions. The simulations not only verify the formation of shock shells and correlations, but they also determine the time- and position-dependent density, temperature, and Coulomb coupling parameter, $\Gamma(\mathbf{r}, t)$ of the expanding plasma. This analysis concludes that the experimental plasma is strongly coupled ($\Gamma(\mathbf{r}, t) \geq 1$) over the course of its expansion, even after experiencing disorder-induced heating.

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