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Magnetic Confinement of an Ultracold Neutral Plasma[1] GRANT GORMAN, MACKENZIE WARRENS, THOMAS KILLIAN, Rice University — Ultracold neutral plasmas (UNPs), created by photoionization of a cold gas, are an excellent tool for studying strongly coupled plasmas, in which the ratio of the nearest neighbor Coulomb energy to the average thermal energy, Γ_i, is greater than one. Magnetized UNPs are of current interest because of the interplay of magnetization and strong coupling, connection to plasma confinement, and modification of recombination dynamics in strong fields. Here, we demonstrate magnetic confinement of an UNP within the same quadrupole magnetic fields used in the magneto-optical trapping of the initial atom cloud. Preliminary results show that the plasma expansion is initially unaffected by the presence of the magnetic field, but after a time that scales with $\sigma(0)/\sqrt{T_e}$, where $\sigma(0)$ is the initial plasma size and T_e is the electron temperature, the expansion essentially ceases and the density stabilizes. We will also discuss complications for the laser-induced-fluorescence ion imaging arising from the presence of magnetic fields.

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