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Negative Ions from Ultracold Rydberg Atoms[1] M. ASCOLI, L. ALDRIDGE, D.M. KARPOV, E.E. EYLER, P.L. GOULD, University of Connecticut — We describe experiments looking for negative ions produced by ultracold Rb Rydberg atoms interacting with ground-state atoms. Starting with Rb atoms in a MOT, we excite a fraction of them to np Rydberg states by use of a single UV photon at 297 nm. After a variable delay, we field ionize the sample with a high-voltage pulse and extract the negative charges, then detect them with to a discrete-dynode electron multiplier with single ion sensitivity. Negative ions are well separated in time-of-flight from the large number of electrons resulting from the field ionization. Similar measurements are being performed starting with an ultracold plasma instead of a Rydberg sample. We will also describe progress towards experiments involving direct excitation to high-lying states of the ion pair Rb^+-Rb^-.

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