Temperature dependence of $\text{Rb}(5P)$+$\text{Rb}(5P) \rightarrow \text{Rb}(6P)$+$\text{Rb}(5S)$ energy pooling process  

S.J. SWEENEY, J. MCANDREW, King’s College, J. HUENNEKENS, Lehigh University — We describe recent progress on a cell-based experiment studying the temperature dependence of energy pooling collisions between excited rubidium atoms in a vapor. We create a thermal population of $\text{Rb}(5P_J)$ atoms using a cw tunable diode laser tuned to the $5S_{1/2} \rightarrow 5P_{1/2}$ transition. Fine-structure changing collisions populate the $5P_{3/2}$ state while energy pooling collisions between $5P$ atoms (of either the same or different $J$ value) will populate higher energy levels. We measure the $6P_{J'} \rightarrow 5S_{1/2}$ fluorescence at right angles to the laser beam and normalize this signal to a combination of the $5P_{3/2}$ fluorescence and $5P_{1/2} \rightarrow 5S_{1/2}$ fluorescence (proportional to each of the $5P_J$ densities, respectively). Varying the temperature of the oven containing the rubidium cell allows us to map the temperature dependence of the $\text{Rb}(5P_J)$+$\text{Rb}(5P_J) \rightarrow \text{Rb}(6P_{J'})$+$\text{Rb}(5S_{1/2})$ energy pooling rate coefficient. Our preliminary results indicate a temperature dependence does exist, but further work is required to verify these results.