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Fine Structure Excitation Transfer in Rb-Buffer Gas Mixtures
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— The purpose of this experiment is to measure the collisional excitation transfer rates between Rb 5P states in the presence of buffer gas mixtures. Rubidium is excited to the $5P_{3/2}$ state with a 780 nm photon and then collision with a buffer gas results in excitation transfer to the $5P_{1/2}$ state followed by emission of a 795 nm photon. Previous studies showed a nonlinear dependence of the excitation transfer rate with the He pressure. We interpreted this increase in terms of three body collisions and developed a theoretical model based on interatomic potentials to explain our experimental results. To better understand the three body collision process and further test our model, we are investigating the excitation transfer process in buffer gas mixtures of He-Ar and He-Xe. We expect to see an increase in excitation transfer in the presence of Ar or Xe even though their excitation rates are much lower than those of He. We will present our experimental results at the conference.

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