Abstract Submitted
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Zeeman relaxation of CaF in low-temperature collisions with helium SCOTT V. NGUYEN, Harvard University, KENNETH MAUSSANG, Harvard University, DIMA EGOROV, Harvard University, JOEL S. HELTON, MIT, JOHN M. DOYLE, Harvard University, HARVARD-MIT CENTER FOR ULTRACOLD ATOMS COLLABORATION — The collision-induced Zeeman relaxation rate for collisions of CaF $X^2\Sigma$ ($v'' = 0$) with ^{3}He is measured at 2 K. 10^{12} CaF molecules, produced via laser ablation, are cooled by a cold he buffer-gas inside a 3.44 T magnetic field. By monitoring the populations of the low-field and high- field seeking states, we extract a Zeeman relaxation rate of $\Gamma_Z = (7.7 + 5.4/-2.5) \times 10^{-15}$ cm$^3/s$ and a ratio of diffusion and inelastic cross-section of $\sigma_{diff}^{CaF-He} \Big/ \sigma_Z^{CaF-He} = (1.3 + 1.3/-0.5) \times 10^4$. This rate is a direct measurement of the influence of spin-rotation coupling on Zeeman relaxation in the ground and first rotational level of CaF. The relationship of this inelastic rate to known molecular constants is consistent with recent theory of cold molecular collisions [1] and outlines the $^2\Sigma$ molecules conducive to magnetic trapping. [1] R. V. Krems and A. Dalgarno, J. Chem. Phys.**120**, 2296 (2004).

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