

Abstract Submitted
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Nonlinear Pressure Shifts of Rubidium in Inert Gases BART MCGUYER, YUAN-YU JAU, WILLIAM HAPPER, Princeton University — Vapor-cell atomic frequency standards are based on the hyperfine (microwave) magnetic-resonance frequencies of optically pumped alkali-metal atoms in inert buffer gas. Through the hyperfine-shift interaction, buffer gas induces pressure shift and broadening in these microwave resonances. Previous work uncovered nonlinear dependence in the pressure shifts of ^{87}Rb and Cs atoms to the pressure of buffer gases Ar and Kr, but not He or N_2 . The nonlinearity is thought to result from alteration to the hyperfine-shift interaction due to temporary van der Waals molecules formed between alkali-metal and buffer-gas atoms. We investigate nonlinear pressure shifts for both isotopes of Rb, ^{87}Rb and ^{85}Rb . This study will test the current model for nonlinear pressure shifts of alkali metals in inert gases.

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