Abstract Submitted
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Preliminary results for a higher-precision measurement of the helium n=2 triplet P fine structure[1] K. KATO, T. D. G. SKINNER, M. C. GEORGE, D. W. FITZAKERLEY, York University, A. C. VUTHA, University of Toronto, C. H. STORRY, N. BEZGINOV, T. VALDEZ, E. A. HESSELS, York University — Preliminary results for a higher-precision measurement of the n=2 triplet P J=1 to J=2 fine-structure interval in atomic helium are presented. A beam of metastable helium atoms is created in a liquid-nitrogen-cooled dc-discharge source, and is intensified using a 2D-MOT. These atoms are excited to the 2 triplet P state, and undergo a frequency-offset separated-oscillatory-field (FOSOF) [PRA 92, 052504 (2015)] microwave experiment. Only atoms which undergo a microwave transition, in the time-separated microwave fields are laser-excited to a Rydberg state and then Stark ionized and counted. Our new experimental design has eliminated the major systematic effects of previous experiments, and has led to a substantial improvement in the signal-to-noise ratio of the collected data. Our final improved measurement (with an expected uncertainty of less than 100 Hz) will allow for a test of 2-electron QED-theory in the helium n=2 triplet P system, and will be an important step towards obtaining a precise determination of the fine-structure constant.

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