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5s-6s two-photon and Stark-induced one photon spectroscopy in rubidium

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The $ns \rightarrow (n+1)s$ transition in alkali atoms is of interest due to its sensitivity to relativistic effects, and it has been the basis for the most stringent atomic parity non-conservation measurement by the Boulder group. We have carried out $5s \rightarrow 6s$ two-photon spectroscopy on rubidium kept in a vapor cell, with the aim of determining $6s$ hyperfine splittings and $5s \rightarrow 6s$ isotope shifts between isotopes 85 and 87 at the 100 kHz level, using RF sideband modulation techniques. In a next step, we will observe the Stark-induced one-photon $5s \rightarrow 6s$ transition in a vapor cell with internal field plates. The goal will be to determine the $5s \rightarrow 6s$ scalar and tensor transition polarizabilities. These measurements are precursors to equivalent measurements in laser-trapped francium atoms at TRIUMF.

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