

ACCESSING THE $5S_{1/2} \rightarrow 5D_{5/2}$ TWO-PHOTON TRANSITION IN Rb USING A DIODE LASER SYSTEM

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We report observation of the $5S_{1/2} \rightarrow 5D_{5/2}$ two-photon transition in Rb vapour at 778 nm, using an external cavity diode laser system and a heated vapour cell. The spectra in the two isotopes show well-resolved hyperfine transitions. The peaks are Doppler free, and have a Lorentzian lineshape with a typical linewidth of 2.2 MHz. This linewidth is larger than the natural linewidth of 300 kHz, but is still 5-10 times smaller than the linewidth for single-photon transitions in the D_2 line. Since the absolute frequency of this transition is measured with 8 kHz precision, it can form a better secondary reference in the optical regime compared to the D_2 line.
