

## Measurement of Hyperfine Structure in the $D_1$ Line of Rb

**Abstract :** We report a precise measurement of hyperfine constants in the  $D_1$  line ( $5 P_{1/2}$  state) of the two stable isotopes of Rb. The motivation for the work is to try and resolve discrepant values that exists in the literature. We use a technique that is different from other methods—one where the laser is not locked to a particular transition but scanned around it. This is advantageous because it overcomes frequency shifts due to servo-loop errors and other sources of noise in the experiment. The values in the two isotopes are:  $A = 120.510(26)$  MHz in  $^{85}\text{Rb}$ , and  $A = 408.340(19)$  MHz in  $^{87}\text{Rb}$ . These values are at variance with earlier values reported from our lab, but consistent with other published measurements.

**Keywords:** Laser spectroscopy; Hyperfine structure; Semiconductor lasers.