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Investigation of the hyperfine structure of the $c^3\Sigma^+$ state in KRb

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The study of the hyperfine structure (HFS) in electronic transitions in diatomic molecules is a challenging task due to its experimental and theoretical complexity. We want to study the HFS of one of the $c^3\Sigma^+$ excited states of the KRb molecule, because previous studies indicated that the splitting may be much larger than in similar alkali metal diatomics [1]. Another motivation is that the $c^3\Sigma^+$ state serves as an intermediate state for transferring cold Feshbach molecules from the $a^3\Sigma^+$ state to the ground $X^1\Sigma^+$ state [2]. Due to the proximity of the $B^1\Pi$ state, perturbations caused by the spin-orbit interaction are observed. This makes possible to observe transition to the mixed pair of states from the singlet $X^1\Sigma^+$ state.

We report on the experimental setup for observation of hyperfine structure of the $X^1\Sigma^+$ - ($c^3\Sigma^+$, $B^1\Pi$) transition. Single laser saturation and polarization spectroscopy and also optical-optical double resonance saturation spectroscopy in V configuration is used. The obtained experimental results will be presented at the conference.

References

1. A. Pashov et. al Phys. Rev. A 76, 022511 (2007)
2. Ni et al., Science 322, 231 (2008)

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