

# Femtosecond laser fluorescence in dense potassium vapor

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Femtosecond (fs) laser excitation of the dense potassium vapor has been studied at very high densities and temperatures, enabled by means of the all-sapphire cell. We investigated the spectral region around the second and the first doublets of potassium atoms. Collisional redistribution from the K(4p) populations into the Rb(5p) population was studied when the mode-locked fs laser light was discretely tuned in the region of 770 nm the first resonance lines.

We observe several interesting spectral features, which point out to a possible new laser effect. This should be further investigated with the sapphire cell within the cavity. We also looked for the conical emission [1, 2] when the fs laser was tuned in the blue wing of the K D<sub>2</sub> line and the effect was extremely small. This indicates that the self-focusing in dense potassium vapor is almost negligible.

## References:

[1] D. Aumiler, T. Ban, G. Pichler, Phys. Rev. A **71**, 063803 (2005).

[2] H. Skenderović, T. Ban, N. Vujičić, D. Aumiler, S. Vdović, and G. Pichler, Phys. Rev. A **77**, 063816 (2008).