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## Nonlinear Faraday rotation in an optical dipole trap

Nonlinear Faraday rotation can be used to make precise measurements of magnetic field. Here I report the observation of nonlinear Faraday rotation in an optical dipole trap which I hope can be utilised to build a precision magnetometer with high spatial resolution.

Continuous wave as well as amplitude modulated optical rotation signals were obtained in a sample of rubidium atoms cooled to about 40  $\mu$ K. Measurements where conducted in a volume determined by the overlapping region of the CO<sub>2</sub> dipole trap and probe beams, which was as small as 0.007mm<sup>3</sup>.

5. April 2011, 13:30 Uhr

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SFB/TRR 21 Control of quantum correlations in tailored matter Stuttgart, Ulm, Tübingen