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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 μK . Measurements were conducted in a volume determined by the overlapping region of the CO_2 dipole trap and probe beams, which was as small as 0.007mm^3 .

