

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Precise measurements of microwave transitions in CH with high sensitivity to variation of fundamental constants STEFAN TRUPPE, RICHARD HENDRICKS, SEAN TOKUNAGA, EDWARD HINDS, MICHAEL TARBUTT, Centre for Cold Matter, Blackett Laboratory, Imperial College London, London, SW72BW, UK — Recent calculations [1] show that the Lambda-doublet transitions of certain diatomic molecules are highly sensitive to possible variations of the electron-to-proton mass ratio and the fine structure constant. The lowest-lying Lambda-doublets of the CH molecule are particularly sensitive and can be observed in astrophysical objects at high red-shift, offering a precise test of variations in these fundamental constants over billions of years, without needing reference lines from other species. To improve the current laboratory measurements of these microwave transitions, we have developed a cold beam of CH radicals and have measured the transition frequencies to high precision using the Ramsey method of separated oscillatory fields.

[1] M.G. Kozlov, “*Lambda-doublet spectra of diatomic radicals and their dependence on fundamental constants*”, Physical Review A **80**, 022118 (2009)

Stefan Truppe
Centre for Cold Matter, Blackett Laboratory,
Imperial College London, London, SW72BW, UK

Date submitted: 30 Jan 2012

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