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Molecular interferometry with $^2\Sigma$ molecules in large magnetic fields SERGEY ALYABYSHEV, ROMAN KREMS, University of British Columbia, UNIVERSITY OF BRITISH COLUMBIA TEAM — $^2\Sigma$ molecules in superimposed magnetic and electric (static or laser) fields exhibit avoided crossings between Zeeman levels of different rotational states as functions of external field parameters [1]. We explore the possibility of using these avoided crossings for molecular interferometry experiments. Our calculations demonstrate that the population of a particular spin state is extremely sensitive to both electric and magnetic fields near avoided crossings between Zeeman levels corresponding to the rotationally ground N=0 and rotationally excited N=1 states. The position and strength of these avoided crossing can be tuned by varying the external fields [1,2]. We propose that an interferometry experiment using $^2\Sigma$ molecules in the presence of a microwave laser field can be used to probe small fluctuations of the magnitude ($\sim$1 Gauss on the background of 4 Tesla) and direction of large magnetic fields (2 - 6 Tesla) on the molecular length scale.

[1] T.V. Tscherbul and R.V. Krems. Physical Review Letters 97, 083201 (2006)
[2] S.V. Alyabyshev and R.V. Krems, Physical Review A 80, 033419 (2009)

Sergey Alyabyshev
University of British Columbia

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