Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Search for strongly coupled Chameleon scalar field with neutron interferometry[1] K. LI, Indiana Univ - Bloomington, M. ARIF, NIST, D. CORY, IQC, Univ. of Waterloo, R. HAUN, Tulane Univ., B. HEACOCK, North Carolina State Univ. and the Triangle Universities Nuclear Laboratory, M. HUBER, NIST, J. NSOFINI, D.A. PUSHIN, IQC, Univ. of Waterloo, P. SAGGU, Univ. of Waterloo, D. SARENAC, IQC, Univ. of Waterloo, C. SHAHI, Tulane Univ., V. SKAVYSH, IUPUI, M. SNOW, Indiana Univ - Bloomington, A. YOUNG, North Carolina State Univ. and the Triangle Universities Nuclear Laboratory — The dark energy proposed to explain the observed accelerated expansion of the universe is not understood. A chameleon scalar field proposed as a dark energy candidate can explain the accelerated expansion and evade all current gravity experimental bounds. It features an effective range of the chameleon scalar field that depends on the local mass density. Hence a perfect crystal neutron interferometer, that measures relative phase shift between two paths, is a prefect tool to search for the chameleon field. We are preparing a two-chamber helium gas cell for the neutron interferometer. We can lower the pressure in one cell so low that the chameleon field range expands into the cell and causes a measurable neutron phase shift while keeping the pressure difference constant. We expect to set a new upper limit of the Chameleon field by at least one order of magnitude.

[1]This work is supported by NSF Grant 1205977, DOE Grant DE-FG02-97ER41042, Canadian Excellence Research Chairs program, Natural Sciences and Engineering Research Council of Canada and Collaborative Research and Training Experience Program

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Date submitted: 09 Jan 2015 Electronic form version 1.4