

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 14 April 2016

17:00 -18:00

3rd Floor Seminar Room

"Adventures with spin"

Prof. Peter Rakitzis

Department of Physics, UoC & FORTH-IESL

Abstract

I will summarize the research efforts of our group in two spin-based fields: (a) The development of ultrasensitive cavity-based polarimetry [1,2] and ellipsometry [3,4], for applications ranging from chirality detection in many fields, parity non-conservation measurements in atoms and molecules, and surface characterization. (b) The production of high-density spin-polarized atoms and molecules [5-7], for NMR signal enhancement, and for the study of spin-dependent collisions and reactions.

[1] L. Bougas, G. Katsoprinakis, W. von Klitzing, J. Sapirstein, T.P. Rakitzis, "Cavity-enhanced parity non-conserving optical rotation in metastable Xe and Hg", *Phys. Rev. Lett.* **108**, 210801 (2012).

[2] D. Sofikitis, L. Bougas, A. Spiliotis, G. Katsoprinakis, B. Loppinet, T.P. Rakitzis, "Evanescent-wave and ambient chiral sensing by signal-reversing cavity-ringdown polarimetry" *Nature* **514**, 76 (2014).

[3] M.A. Everest, V. Papadakis, K. Stamataki, S. Tzortzakis, B. Loppinet, T.P. Rakitzis, "Evanescent-wave cavity ring-down ellipsometry", *J. Phys. Chem. Lett.* **2**, 1324 (2011).

[4] D. Sofikitis, A. Spiliotis, K. Stamataki, G. Katsoprinakis, L. Bougas, P.C. Samartzis, B. Loppinet, T.P. Rakitzis, E. Sourligas, S. Papadakis, "Microsecond-resolved SDR-based Cavity Ring-Down Ellipsometry" *Appl. Opt.* **54**, 5861-5865 (2015).

[5] T.P. Rakitzis, P.C. Samartzis, R.L. Toomes, T.N. Kitsopoulos, Alex Brown, G.G. Balint-Kurti, O.S. Vasyutinskii, J.A. Beswick, "Spin Polarized Hydrogen Atoms from Molecular Photodissociation," *Science* **300**, 1936 (2003).

[6] T.P. Rakitzis, "Highly spin-polarized atoms and molecules from rotationally state-selected molecules" *Phys. Rev. Lett.* **94**, 83005 (2005).

[7] D. Sofikitis and T.P. Rakitzis "Mesoscopic production of hyperpolarized ¹⁵N₂O and H₂O via optical excitation" *Phys. Rev. A* **92**, 032507 (2015).