Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Frequency-comb-induced radiative force on cold rubidium atoms[1]

DAMIR AUMILER, GORDANA KREGAR, Institute of Physics, Bijenicka cesta 46, 10000 Zagreb, Croatia, NEVEN ŠANTIĆ, HRVOJE BULJAN, Department of Physics, University of Zagreb, Bijenicka cesta 32, 10000 Zagreb, Croatia, TICIJANA BAN, Institute of Physics, Bijenicka cesta 46, 10000 Zagreb, Croatia — Excitation of atoms by trains of ultrashort laser pulses yields atomic coherence effects, such as accumulation of excited-state population and coherence [1]. These effects become more pronounced in atomic systems at (ultra)low temperatures (no dephasing due to collisions). Somewhat surprisingly, experiments with (ultra)cold atomic gases involving trains of ultrashort pulses are scarce in the literature. The same also applies to optomechanical effects on atoms induced by resonant frequency comb (FC) excitation. We will present results of the radiative force measurements in cold rubidium atoms induced by the coherent pulse train (i.e. FC) excitation [2]. Various experimental geometries will be studied, including single pulse train excitation, two in-phase and out-of-phase counter-propagating pulse trains, and various time delays between the pulse trains. The force measurements will be supported by theoretical modeling using optical Bloch equations, and supplemented by laser-induced fluorescence measurements.

[1] D. Aumiler, T. Ban, and G. Pichler, Phy. Rev. A 79, 063403 (2009).
[2] G. Kregar, N. Šantić, D. Aumiler, H. Buljan, and T. Ban, Phys. Rev. A 89, 053421 (2014).

[1]This work was supported by the UKF Grant 5/13.

Damir Aumiler
Institute of Physics, Bijenicka cesta 46, 10000 Zagreb, Croatia

Date submitted: 30 Jan 2015 Electronic form version 1.4