Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

See-saw Doppler cooling of three-level atoms by coherent pulse trains[1] MAHMOUD AHMED, EKATERINA ILINOVA, ANDREI DEREVIANKO, University of Nevada at Reno — We explore the feasibility of decelerating and Doppler cooling an ensemble of three-level Λ-type atoms by a coherent train of ultrashort laser pulses. In the frequency domain such trains form frequency combs. We show that driving atoms by frequency combs that do not satisfy the two-photon Raman resonance condition results in a persistent radiative force. We also propose a see-saw scheme of cooling multilevel atoms. In these scheme the teeth of the frequency comb are periodically moved in and out of resonance for the allowed transitions. The see-saw cooling may be practically attained by switching carrier-envelope phase between predefined values. We carry out numerical calculations of optimal train parameters, radiative force and time evolution of the velocity distribution

[1]This work was supported in part by the ARO.

Mahmoud Ahmed
University of Nevada at Reno

Date submitted: 27 Jan 2012 Electronic form version 1.4