Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Cavity cooling of free nanoparticles in high vacuum PETER ASENBAUM, STEFAN KUHN, UGUR SEZER, STEFAN NIMMRICHTER, MARKUS ARNDT, University of Vienna — Cavity cooling has been successfully applied to single atoms, ions and atomic ensembles. It is however, most indispensable for larger and more complex particles, where direct laser cooling techniques are not applicable. We demonstrate cavity cooling of a silicon nanoparticle with a reduction of the transverse kinetic energy by a factor of over 30 [Asenbaum, P. et al. Nat. Commun. 4:2743]. Utilizing a pulsed laser we create and launch silicon nanoparticles beneath a high finesse cavity in high vacuum environment. While the particles transit through the intense cavity field the transverse velocity is reduced. By detecting the scattered light from the particle we can trace its movement in real time. Advancing this technique will be crucial to enable quantum coherence experiments with nanoparticles.

Peter Asenbaum
University of Vienna

Date submitted: 02 Nov 2013 Electronic form version 1.4