Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Continuous, guided atomic beams[1] MALLORY TRAXLER, ERIK POWER, GEORG RAITHEL, University of Michigan — We report on progress towards a continuous atom laser based on continuous evaporative cooling in a magnetic guide. In the pursued approach, atoms are collected in a MOT located on the guide axis, transferred into a three-dimensional magnetic trap, and adiabatically merged, using a short magnetic conveyor, with a cold-atom flow in the evaporative-cooling portion of the guide. To enable continuous guiding and cooling, the guiding field is always on. The majority of the work in assembling this apparatus is concluded. The apparatus shares some of its characteristics with an operational guide, in which ^{87}Rb atoms are guided over a distance of 1.5 m with a transverse temperature of 400 μK, a longitudinal temperature of 1 mK, and a flux of 3x10^7 atoms/s. The operational setup has recently been employed to explore the prospects of a photo-ionization / ion counting scheme for efficient atom detection in magnetic atom guides. Further, we have prepared Rydberg atoms in the guide and studied the guiding as well as the Penning ionization dynamics of these atoms. The current status of both the Rydberg guiding experiments and the continuous evaporative cooling apparatus will be presented.

[1]MT acknowledges fellowship support from NDSEG

Mallory Traxler
University of Michigan

Date submitted: 22 Jan 2010 Electronic form version 1.4