Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Sorting Category: 21.13 (C)

Construction of an apparatus to characterize the early evolution of ultracold neutral plasma[1] LUCAS WILLIS, Rowan University, MICHAEL LIM, Rowan University — A magneto-optical trap was constructed for the purpose of charting early atomic recombination rates in an ultracold neutral plasma, which is created by photoionizing laser cooled rubidium atoms. Planned experiments will focus primarily on the first 100 nanoseconds of plasma evolution, during which a ramped electric field will be applied to Rydberg atoms that recombine from the plasma components. The ramped field will ionize loosely-bound states, liberating electrons at times that are correlated with binding energy. An electron beam comprised of a series of electrostatic lenses enables the transport of these electrons from the MOT region to a multichannel plate electron detector (MCP). We devised a system to raster the beam across the MCP to prevent detector saturation and the loss of signal due to electron multiplier recovery times. We will also discuss other apparatus features that allow flexible electric and magnetic field configurations.

[1]Work supported in part by Research Corporation

[X] Prefer Oral Session
[ ] Prefer Poster Session

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Date submitted: 30 Nov 2005 Electronic form version 1.4