

Abstract Submitted
for the 4CF15 Meeting of
The American Physical Society

A First Look at Laser-cooling Ions in an Ultra-cold Neutral Plasma¹ KADE BISHOP, SCOTT BERGESON², Brigham Young University — We discuss progress in laser-cooling ions in an ultra-cold neutral plasma. A major challenge to implementing a laser-cooling scheme is that the laser-cooling transition is not closed. A fraction of the ions decay into "dark" metastable states and are lost to the cooling process. We have built a system using two infrared diode lasers to optically pump atoms out of the metastable states. The optical pumping transitions form a λ -system. Avoiding atomic coherences associated with this configuration may be necessary to achieve maximum laser cooling. We describe our laser system and its use in cooling calcium ions in our ultra-cold neutral plasma. We report on the increased efficiency of ion-cooling through repumping into the cooling transition.

¹This research is supported in part by NSF Grant No. PHY-1404488.

²Research Advisor

Kade Bishop
Brigham Young University

Date submitted: 11 Sep 2015

Electronic form version 1.4