Abstract Submitted
for the SES15 Meeting of
The American Physical Society

Progress Report on Quantum Defect of Rb-87 in Ultracold Conditions LINDSAY HUTCHERSON, JUSTIN SANDERS, JIANING HAN, University of South Alabama — New research techniques using a magneto-optical trap (MOT) have led to a fresh perspective in which to explore repulsive Van der Waals forces, as well as to create ultracold atoms that are not commonly available. In order to understand these repulsive forces, we must utilize excited atoms that have reached their Rydberg states, which means we must also pay careful attention to and calculate the quantum defect measurements involved in these Rydberg atoms. These quantum defects have been calculated based on older equations and the data will be used in experimentation. With the use of a 780 nm laser, we can create inelastic collisions with these atoms in order to reduce momentum and cool the atoms. The excited atom involved in each collision will soon emit any absorbed photons from the laser in spontaneous and random directions, which gradually slows the atom. This particular technique is known as laser cooling. We are currently in the preliminary stages of this experiment.

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Date submitted: 16 Oct 2015 Electronic form version 1.4