Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Circular Rydberg states of atomic hydrogen in an arbitrary magnetic field[1] L.B. ZHAO, B.C. SAHA, Department of Physics, Florida A&M University, Tallahassee, FL-32307, M.L. DU, Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing 100190, China — A theoretical method using a B-spline basis set has been proposed to evaluate circular Rydberg states of atomic hydrogen in a strong magnetic field. The combination of this method and a recently reported finite-basis-set technique [1] can provide a practicable scheme to implement high accuracy computations of circular Rydberg states of atomic hydrogen in an arbitrary magnetic field. Energy levels of hydrogen are presented for circular Rydberg states with azimuthal quantum numbers |m| = 10 - 70 as a function of magnetic field strengths ranging from zero to 2.35 x 10^9 T. Comparison with available theoretical data shows excellent agreement. The variation of spatial distributions of electron probability densities with magnetic field strengths is discussed and competition between Coulomb and magnetic interactions is illustrated.

[1] J. Phys. B**40**, 4347 (2007)

[1]Supported by NSF-CREST project (grant #0630370).

Bidhan Saha
Dept of Physics, Florida A&M University, Tallahassee, FL-32307

Date submitted: 07 Feb 2011 Electronic form version 1.4