

Abstract Submitted
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The Long-Range Model of High-L Rydberg Fine Structure: A Critical Comparison with Experimental Data.¹ ERICA L. SNOW, LAURA E. WRIGHT, STEPHEN R. LUNDEEN, Dept. of Physics, Colorado State Univ. — A simple view of the fine structure of non-penetrating Rydberg levels, suggested over 70 years ago [1], was refined to treat the fine structure of helium, lithium [2], and other atoms with S-state ion cores [3]. In this view the ion polarizabilities determine the fine structure pattern. Current experimental techniques provide access to highly excited high-L states in He [4], Li [5], Mg, SiIII [6], and Ba[7], and a test of the long-range model is possible with the availability of independent theoretical calculations. A critical comparison of the data treated with the long-range model will be made to the a-priori calculations of the ionic polarizabilities. [1] Joseph E. Mayer and Maria Goeppert Mayer, *Phys. Rev.* **43** 605 (1933). [2] Richard J. Drachman and A. K. Bhatia, *Phys. Rev. A* **51** 2926 (1995). [3] C. Laughlin, *J. Phys. B: At. Mol. Opt. Phys.* **28** 2787 (1995). [4] G. D. Stevens and S. R. Lundeen, *Comments on At. and Mol. Phys., Comments on Mod. Phys.* **1,D** 207 (2000). [5] C. H. Storry, N. E. Rothery, and E. A. Hessels, *Phys. Rev. A* **55** 128 (1997). [6] R. A. Komara et. al., *J. Phys. B: At. Mol. Opt. Phys.* **38** S87 (2005). [7] E.L. Snow, et. al. *Phys. Rev. A* **71**, 022510 (2005)

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