

Abstract Submitted
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Higher-order contributions to fine structure in high-L Rydberg states of Si^{2+} .¹ ERICA L. SNOW, SUNY Fredonia, STEPHEN R. LUNDEEN, Colorado State University — Measured fine structure patterns of high-L Rydberg states have often been used to extract measurements of both dipole and quadrupole polarizabilities of their positive ion cores. Dipole polarizabilities deduced in this way are apparently quite accurate, judging by comparison with calculated values, but the accuracy of quadrupole polarizabilities is questionable. The polarizabilities of Na-like Silicon are a good example. Recent fine structure measurements seem to imply a quadrupole polarizability in clear disagreement with calculations. This apparent discrepancy is due to misinterpretation of the experimental data, neglecting the effects of higher-order terms in the polarization potential that can significantly alter the slope of the traditional polarization plots. When these terms are calculated, and their magnitude estimated, the discrepancy is eliminated. The implications of the higher order terms for analysis of high-L fine structure patterns are discussed.

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