

Abstract Submitted  
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**Calculation of higher order corrections to the positronium hyperfine splitting**<sup>1</sup> GREGORY ADKINS, Franklin and Marshall College, RICHARD FELL, Brandeis University — The positronium ground state hyperfine splitting (hfs) has long been of interest as a high-precision test of our understanding of binding in QED. The positronium hfs is particularly sensitive to recoil effects (because the ratio of masses is one) and to virtual electron-positron annihilation, but positronium is insensitive to strong and weak interaction effects. Consequently, the comparison between theory and experiment for the positronium hfs, and more generally the positronium spectrum, tests different aspects of the theory compared to comparisons in other exotic atoms. For the past fifteen years there has been a persistent discrepancy between predicted and measured values of the positronium hfs of about four standard deviations—although a new experimental result is consistent with present theory. Recent experimental work is leading to new high-precision measurements, and the calculation of corrections at order  $m\alpha^7$  has begun. We report on the status of the positronium hfs problem and a discussion of recent progress.

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Gregory Adkins  
Franklin & Marshall College, Lancaster, PA 17604

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