Abstract Submitted
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Prize for a Faculty Member for Research in and Undergraduate Institution: Higher order corrections to positronium energies[1] GREGORY ADKINS, Franklin and Marshall College — Positronium spectroscopy is of continuing interest as a high-precision test of our understanding of binding in QED. Positronium–the electron-positron bound state–represents the purest example of binding in QFT as the constituents are structureless and their interactions are dominated by QED with only negligible contributions from strong or weak effects. Positronium differs from other Coulombic bound systems such as hydrogen or muonium in having maximal recoil (the constituent mass ratio m/M is one) and being subject to real and virtual annihilation into photons. Positronium spectroscopy ($n = 1$ hyperfine splitting, $n = 2$ fine structure, and the $2S-1S$ interval) has reached a precision of order $1MHz$, and ongoing experimental efforts may lead to improved results. Theoretical calculations of positronium energies at order $m\alpha^6 \sim 18.7MHz$ are complete, but only partial results are known at order $m\alpha^7 \sim 0.14MHz$. I will report on the status of the positronium energy calculations and present new results for order $m\alpha^7$ contributions.

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