Relativistic One-Electron Atomic Energies and Properties

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September 25, 2021

Abstract

We use variance minimization and Monte Carlo integration to calculate the relativistic one-electron atomic (Z=92) wavefunctions (both the 2-component and 4-component forms) for the 1S1/2, 2S1/2, 2P1/2, 2P3/2, 3S1/2, 3P1/2, 3P3/2, 3D3/2 and 3D5/2 states. With these wavefunctions we then evaluate the energy, a variety of simple properties and the decay rates for a number of E1, M1, E2 and M2 transitions. Our results are in excellent agreement with those in the literature.

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