Abstract Submitted
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Rydberg helium and the helium dimer: Relativistic and retardation effects[1] J.F. BABB, ITAMP, Harvard-Smithsonian — The energy level structure of a Rydberg helium atom with one electron in a highly-excited nl state can be modeled with high accuracy using an effective potential based on a long-range expansion in powers of the distance r between the Rydberg electron and the nucleus. In addition to the dominant Coulomb interactions, small relativistic $O(\alpha^2)$ terms and smaller quantum electrodynamical $O(\alpha^3)$ effects, as well as retardation effects, can be included. For the helium dimer He_2 a similar effective potential in powers of the internuclear distance R can be developed [Przybytek et al. PRL 108, 183201 (2012)]. The interpretations of the effective potentials for Rydberg He and for the He dimer are discussed.

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