Hyperfine structure in heavy muonic atoms

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We consider bound states between an atomic nucleus and a muon, so called muonic atoms. Especially for high charge numbers, the surrounding atomic electrons do not influence the muon and the systemis essentially hydrogenlike. Just as in normal atoms, there is fine andhyperfine splitting, but the significance of the various contributionsdiffers dramatically. In particular, nuclear structure effects are muchbigger, and vacuumpolarization effects are very important. We calculate the level structure in heavy muonic atoms, taking several QED and nuclear structure effects into account in first-order perturbation theory and beyond. Thereby, precise values of the hyperfine structure of muonic atoms are obtained [1] and the dependence of transition energies in muonic atoms on nuclear parameters is investigated.

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