Gravitational Corrections to Energy-Levels of a Hydrogen Atom

ZHAO Zhen-Hua,[1] LIU Yu-Xiao,[2] and LI Xi-Guo[1]

[1] Institute of Modern Physics, the Chinese Academy of Sciences, Lanzhou 730000, China
[2] Institute of Theoretical Physics, Lanzhou University, Lanzhou 730000, China

Abstract: The first-order perturbations of the energy levels of a hydrogen atom in central internal gravitational field are investigated. The internal gravitational field is produced by the mass of the atomic nucleus. The energy shifts are calculated for the relativistic 1S, 2S, 2P, 3S, 3P, 3D, 4S, and 4P levels with Schwarzschild metric. The calculated results show that the gravitational corrections are sensitive to the total angular momentum quantum number.

[Full text: PDF]

Close