



Contribution ID: 175

Type: Poster

Spectroscopy and dynamics of hadronic atoms and heavy ions: energy shifts and widths and strong interaction corrections

Thursday, 3 September 2015 16:30 (1h 30m)

Our work is devoted to spectroscopy and dynamics of hadronic (kaonic, pionic) atoms, heavy H-,Li-like ions (test systems) within ab initio nuclear-relativistic many-body perturbation theory [1] with accounting nuclear, radiative effects. One of the purposes is establishment a quantitative link between quality of nuclear structure modeling and accuracy of calculating spectra. The wave functions zeroth basis is found from the Klein-Gordon-Fock equation for K-, pi- atoms and Dirac-Fock for ions. The potential includes SCF ab initio potential, the electric and polarization potentials of a nucleus (the RMF and Gauss models for a nuclear charge distribution) [1]. The Lamb shift polarization part is treated in the Uhling-Serber approximation and the self-energy part – within the Green function method. New data are listed on: 1). Spectra of H-,Li-like ions ($Z= 55-100$); 2). Shifts, widths in kaonic K-atoms (H, He, W, Pb, U); 3). Shifts, widths in pi-atoms (H, He, W, Pb, U)

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[2] C. Batty et al., Phys. Rev. C 40, 2154 (1989); R. Deslattes et al., Rev. Mod. Phys. 75, 35 (2003); D. Anagnostopoulos et al., Nucl. Instr. Meth. B 205,9 (2003); K. Seth, EPJ Web of Conf. 3, 07006 (2010).

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Session Classification: Poster