Contribution ID: **114** Type: **Poster Presentation**

Computational modelling of electroweak interaction effects in atomic and molecular systems within Nuclear-QED perturbation theory

Tuesday, 12 July 2016 16:30 (1 hour)

Abstract content
   (Max 300 words)
Formatting &
Special chars

Nowdays the atomic parity on-conservation (PNC) in finite Fermi systems has a potential to probe a new physics beyond the Standard model. In our paper we systematically apply computational code based on the QED many-body perturbation theory (PT) [1,2] to precise numerical calculation of the PNC effect in heavy atoms with taking into account the relativistic, nuclear, radiative corrections. The key element is in an accurate taking into account the correlation corrections of the PT second and higher orders (dominating classes: Coulomb interaction screening; interaction «particle-hole» ; mass operator iterations), which is based on using the Feynman diagrammatic technique and Green function (GF) method. There are presented the results of the calculating PNC amplitudes for a number of heavy atomic systems (¹³³Cs, ¹⁷³Yb, ²⁰⁵Tl, etc) with account of the exchange- correlation, Breit, weak e-e interactions, radiative, nuclear (magnetic moment distribution, finite size, neutron “skin”) corrections. The nuclear spin-dependent PNC interactions due to nuclear anapole moment (ka contribution), Z- exchange interaction from nucleon axial-vector (AnVe) currents (k2), the combined hf and spin-independent Z exchange interaction from nucleon vector (VnAe) currents (khf) are considered too.
1. O.Yu.Khetselius, Int. J. Quant.Chem. 109, 3330 (2009) ; Phys.Scripta. T135, 014023 (2009).
2. O.Yu. Khetselius, Journal of Physics: Conf. Ser. 397, 012012 (2012); in: Quantum Systems in Chem. and Phys.: Progress in Methods and Applications, Series: Progr.Theor. Chem. and Phys., eds. K. Nishikawa, J. Maruani, E Brandas et al, (Springer) 26, 57 (2013);

Primary author: Prof. KHETSELIUS, Olga (Odessa State University-OSENU)

Co-authors: Prof. GLUSHKOV, Alexander (Odessa State University-OSENU); Dr KUZNETSOVA, Anna (Odessa State University-OSENU); Mrs PONOMARENKO, Elena (Odessa State University-OSENU); Ms GURSKAYA, Marina (Odessa State University-OSENU); Dr DUBROVSKAYA, Yuliya (Odessa State University-OSENU)

Presenters: Prof. GLUSHKOV, Alexander (Odessa State University-OSENU); Ms GURSKAYA, Marina (Odessa State University-OSENU)

Session Classification: Poster Session

Track Classification: High Energy, Nuclear and Particle physics