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Resonance phenomena in heavy nuclei collisions and dynamical Stark effect for nuclei in super strong laser field

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We present new approach for studying interaction of the finite Fermi systems (nuclei) with an superintense external fields (laser field). It is the combined relativistic operator perturbation theory (OPT) and relativistic energy formalism (REA) [1]. We present new results of AC Stark shifts of single proton states in the nuclei 16O, 168Er and compared these data with known results by Keitel et al [2]. New data are also listed for the 57Fe,171Yb nuclei. Shifts of several keV are reached at intensities of roughly 10^34 W/cm^2 for O and 10^32 W/cm^2. New unified approach (OPT+REA) [1] is used for studying the electron-positron pair production (EPPP) in heavy nuclei collisions and treating a compound nucleus in a field. Heavy ions collisions near the Coulomb barrier are surrounded by existence of narrow e+ line in a positron spectra [1,2]. The positron spectrum narrow peaks as a spectrum of the resonance states of compound super heavy nucleus are treated. The calculation results for cross-sections at different collision energies for 238U+238U, 232Th+250Cf pairs are presented.

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