

Unified Description of the Proton, Alpha, Cluster Decays and Spontaneously Fusions Half-Life

S.Cht. Mavrodiev¹, M.A. Deliyergiyev²

¹Institute for Nuclear Researches and Nuclear Energy, BAS, Sofia, Bulgaria

²Department of High Energy Nuclear Physics, Institute of Modern Physics, CAS, Lanzhou, China

Many years ago, the possibility of classical (without Gamow tunneling) universal description of radioactive nuclei decay has been demonstrated. Such possibility is based on the classical interpretation of Bohmian Psi field reality in Bohmi - Chetaev mechanics and the hypothesis for the presence of dissipative forces, generated from the Gryzinsky translational precession of the charged particles spin, in Langevin-Kramer's diffusion mechanism. In this paper an unified model of proton, alpha decays, cluster radioactivity and spontaneous fission half- times is presented as an explicit function which depends on the total decay and kinetic energies, the number of protons and neutrons of daughter products, the number of protons and neutrons of mother nucleus and from a set of unknown digital parameters. The half- times of the 573 nuclei taken from NuDat database together with the recent experimental data from Oganessian paper provide a basis for discovering the explicit form of the Kramer's solution of Langevin type equation in a framework of inverse problems of the Alexandrov dynamic auto-regularization method (FORTRAN program REGN-Dubna). The procedure LCH in the program REGN permitted to reduce the number of unknown digital parameters from 137 to 79. The model describes 424 decays quantities with deviation of order one in years power scale.