



Contribution ID : 84

Type : Oral talk

Nuclear decay oscillations as possible emergent gravity effect

Friday, 2 December 2022 18:35 (15)

Recently, several experiments reported small violations of radioactivity law in alpha- and beta-decay of heavy nuclei [1,2]. Beside standard exponential time dependence of nuclei decay rate, they found additional periodic terms of the order .05% corresponding to annual and daily nucleus life-time oscillations. It supposes that decay parameter variation can be related to temporary variation of Sun gravitation potential U in lab., resulting from elliptic form of Earth orbit and its daily rotation [1]. We argue that such effects can be explained by nonlinear interaction of quantum systems with gravity proposed by Kibble [3,4]. It corresponds also to some emergent gravity theories, in which gravity induced by scalar bilocal field Φ [4,5]. Φ interaction with bilocal nucleus operators described by Doebner- Godin nonlinear formalism [6] can significantly influence nucleus decay life-time [7]. For Gamow alpha-decay model, such nonlinear terms induce nucleus life-time variations, which agree with experimental results for Po-214 alpha-decay [7].

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Session Classification : Gravitation and Cosmology

Track Classification : Gravitation and cosmology