

Search for periodical variations of Fe-55 isotop weak decay parameters

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Possible temporal variations of nucleus decay parameters studied extensively in the last years, their observation can be the signal of unknown physical effects. Earlier, several experiments reported the annual and daily decay rate oscillations in alpha and beta-decays of some nuclides of the order .05 % [1,2]. BGU - PhIAN experiment studies the decay rate variations in inverse beta-decay (e-capture) of Fe-55 isotope. In this process K-shell electron absorbed by nuclei and electron neutrino emitted; it accompanied by X-ray with energy 5,9 or 6,4 KeV which in our set-up detected by cooled Si-Pin detectors. Measurements of decay rate performed in 2016 -2018 , demonstrate that together with observed Fe-55 decay exponent with life-time 1004 days, annual oscillation component value is present at the level (.21 +/- .04)%. Another period 29.5 +/- 1.5 days corresponding to moon month is found with amplitude (.32 +/- .4)% . Simultaneous Fe-55 decay measurements by Si-Pin detectors in orbital flight conditions and in Earth conditions are planned at International Space Station as part of DODO project.

1. E. Fischbach et al. , Rev. Space Sci. 145, 285 (2009); Astrop. Phys. 59,47 (2014)
2. E. Alekseev et al. , Phys. Part. Nucl. (2018) to be published; ArXiv:1505.01752

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