



Nuclear Experiment

Analysis of Experiments Exhibiting Time-Varying Nuclear Decay Rates: Systematic Effects or New Physics?

Jere H. Jenkins, Ephraim Fischbach, Peter A. Sturrock, Daniel W. Mundy

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Since the 1930s, and with very few exceptions, it has been assumed that the process of radioactive decay is a random process, unaffected by the environment in which the decaying nucleus resides. There have been instances within the past few decades, however, where changes in the chemical environment or physical environment brought about small changes in the decay rates. But even in light of these instances, decaying nuclei that were undisturbed or un-"pressured" were thought to behave in the expected random way, subject to the normal decay probabilities which are specific to each nuclide. Moreover, any "non-random" behavior was assumed automatically to be the fault of the detection systems, the environment surrounding the detectors, or changes in the background radiation to which the detector was exposed. Recently, however, evidence has emerged from a variety of sources, including measurements taken by independent groups at Brookhaven National Laboratory, Physikalisch-Technische Bundesanstalt, and Purdue University, that indicate there may in fact be an influence that is altering nuclear decay rates, albeit at levels on the order of 10^{-3} . In this paper, we will discuss some of these results, and examine the evidence pointing to the conclusion that the intrinsic decay process is being affected by a solar influence.

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