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Concerning the Phases of Annual Variations of Nuclear Decay Rates

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Recent analyses of datasets acquired at the Brookhaven National Laboratory and at the Physikalisch-Technische Bundesanstalt both show evidence of pronounced annual variations, suggestive of a solar influence. However, the phases of decay-rate maxima do not correspond precisely to the phase of minimum Sun-Earth distance, as might then be expected. We here examine the hypothesis that decay rates are influenced by an unknown solar radiation, but that the intensity of the radiation is influenced not only by the variation in Sun-Earth distance, but also by a possible North-South asymmetry in the solar emission mechanism. We find that this can lead to phases of decay-rate maxima in the range 0 to 0.183 or 0.683 to 1 (September 6 to March 8) but that, according to this hypothesis, phases in the range 0.183 to 0.683 (March 8 to September 6) are "forbidden." We find that phases of the three datasets here analyzed fall in the allowed range.

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