Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Double-Beta-Decay as a Possible Indicator of Change in the Strong Force EUGENE CHAFFIN, North Greenville University — When the half-lives of Te-130 and Se-82 for two-neutrino double-beta decay are measured using modern techniques, the results are different from values obtained, for geologically old samples, by measuring the radiogenic decay products and the parent concentrations. The reason for this discrepancy is not known, but we examine the systematics of the available data to determine if this could be due to a change in the strength of the strong force or the weak force. The available geologic data are limited to these samples for which the decay products are noble gases. A graph of the available data shows a change in the half-life between Precambrian and Phanerozoic samples. Alternate hypotheses, such as catastrophic xenon and krypton loss from the samples suffer from a lack of plausibility. There is no apparent geologic reason why there should be catastrophic xenon loss from Precambrian rocks compared to Phanerozoic rocks, or similarly why the leakage of xenon should be greater for Precambrian rocks than Phanerozoic rocks. If there had been continuous leakage there shouldn't be such a disparity around a specific transition shown in the graph. Possible mechanisms, such as a change in the vacuum expectation value of the Higgs field or a change in the neutrino rest mass, are discussed.

Eugene Chaffin
North Greenville University

Date submitted: 05 Jan 2012 Electronic form version 1.4