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Beta-asymmetry parameter of 67Cu for tensor current search

Tuesday 10 September 2013 18:00 (3 hours)

The β-asymmetry parameter A for the pure Gamow-Teller decay of 67Cu was measured by the low temperature nuclear orientation method. A 3He-4He dilution refrigerator cooled down to milliKelvin temperatures an iron sample foil into which the radioactive nuclei were implanted. An external magnetic field of 0.1 T in combination with the internal hyperfine magnetic field oriented the nuclei. The anisotropic β radiation was observed with planar high purity germanium detectors operating at a temperature of about 10 K. An on-line measurement of the β-asymmetry of 68Cu was also performed for normalization purposes. Systematic effects were investigated using Geant4 simulations. The result, A = 0.584(13) is in agreement with the Standard Model value of 0.5998(2) and is interpreted in terms of physics beyond the Standard Model. The limits obtained on possible tensor type charged currents in the weak interaction hamiltonian are -0.020 < (CT + CT)/CA < 0.167 (90% C.L.). Combined results of recent measurements employing the same technique will also be presented.

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