

Nuclear Theory

Microscopic calculations of isospin-breaking corrections to superallowed beta-decay

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The superallowed beta-decay rates that provide stringent constraints on physics beyond the Standard Model of particle physics are affected by nuclear structure effects through isospin-breaking corrections. The self-consistent isospin- and angular-momentum-projected nuclear density functional theory is used for the first time to compute those corrections for a number of Fermi transitions in nuclei from $A=10$ to $A=74$. The resulting leading element of the CKM matrix, $|V_{ud}| = 0.97447(23)$, agrees well with the recent result by Towner and Hardy [Phys. Rev. C **77**, 025501 (2008)].

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