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Isospin-symmetry-breaking effects in nuclear β decay[1]

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Precisely measured ft values of $J^\pi = 0^+ \rightarrow 0^+$ β decays of isospin $T = 1$ nuclei are used to set stringent limits on scalar and right-handed interactions, verify the conserved vector current hypothesis at the $\sim 10^{-4}$ level, and provide the most precise measurement of V_{ud}, the up-down element of the Cabibbo-Kobayashi-Maskawa quark-mixing matrix. In order to utilize the measured ft values for these purposes, one must first apply theoretical corrections for isospin-symmetry-breaking and radiative effects. In recent years, the nuclear-structure-dependent isospin-symmetry-breaking calculations have been placed under intense scrutiny; concurrently, experimental work has measured these corrections in cases where they are relatively large. This talk will review the effects of isospin-symmetry breaking in superallowed transitions and discuss recent results aimed at testing the validity of the corrections that are applied.

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