
Coulomb correction to superallowed beta decay

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Abstract

The study of $0^+ \rightarrow 0^+$ nuclear beta decays plays an important role in the study of the electroweak interaction. These transitions are now well known in the decays of a wide range of nuclei for example ^{10}C ($T = 1$, $T_z = -1$). The evaluation of its matrix elements is considered to be important because it can relate to the u -quark to d -quark transition matrix element V_{ud} in the Cabibbo-Kobayashi-Maskawa matrix (see the reference [1] for the newest update). The Coulomb correction is one of the corrections that one has to introduce in the study. In this presentation, we introduce the calculation of Coulomb correction to super-allowed beta decay [2, 3]. We use the values of the isospin mixing obtained in reference [4] that is probably, at present, one of the best calculations of isospin mixing in the ground states of even-even nuclei. The notion of the isovector monopole state and the self-consistent charge-exchange Random Phase Approximation are the two methods of calculation. The main purpose of the work is to clarify the collective effects of the particle-hole space in the isovector channel. The motivation and future perspective of the study are also discussed.

References:

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