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The implications of different nuclear matrix element calculations in neutrinoless double beta decay experiments

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Nuclear matrix elements (NME) are a crucial input for the interpretation of neutrinoless double beta decay data. We consider a representative set of recent NME calculations from different methods and investigate the impact on the present bound on the effective Majorana mass mββ by performing a combined analysis of the available data as well as on the sensitivity reach of future projects. The light neutrino exchange mechanism and type-I minimal seesaw framework are considered, respectively. In the former case, we highlight that a crucial role is played by the recently discovered short-range contribution to the NME, induced by light Majorana neutrino masses. The sign-uncertainty may either boost the sensitivity of next-generation experiments beyond the region for mββ predicted for inverted mass ordering or prevent even advanced setups to reach this region. In the framework of type-I minimal seesaw mechanism, we discuss the uncertainties induced by NME calculations in deriving the limits or sensitivities of the heavy neutrino parameters. The talk will focus on the potential of current and future neutrinoless double beta experiments to explore neutrino parameters and new physics parameters as well as to discriminate different NME calculation models.

Collaboration (if any)

Primary author: 朱, 景宇 (中国科学院近代物理研究所)

Co-authors: Prof. LI, Yufeng (Institute of High Energy Physics, Beijing); 房, 栋梁 (中科院近物所)

Presenter: 朱, 景宇 (中国科学院近代物理研究所)

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