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Unveiling the mysteries of neutrinoless double beta decay: exploring Nuclear Matrix Elements and their impact on Majorana mass sensitivities.

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Nuclear Matrix Elements (NME) are a crucial input for the interpretation of neutrinoless double beta decay data. A representative set of recent NME calculations from different methods is taken, and a combined analysis of the available data performed in order to investigate the impact on the current and future sensitivities on the effective Majorana mass. A crucial role is played by the recently discovered short-range contribution to the NME, induced by light Majorana neutrino masses. Depending on the NME model and the relative sign of the long- and short-range contributions, the current 3σ bounds change, and the sensitivity of next-generation experiments can be either pushed beyond the inverted mass ordering region or never reach this one. Furthermore, perspectives on the possibility to distinguish between different NME calculations by assuming a positive signal and by combining measurements from different isotopes is presented.

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