Contribution ID : **43** Type : **Talk**

New ways to shed light on neutrinoless double-beta decay

Observing neutrinoless double-beta ($0\nu\beta\beta$) is undoubtedly one of the most anticipated breakthroughs in modern-day neutrino, nuclear and particle physics. When observed, the lepton-number-violating process would provide unique vistas beyond the Standard model of particle physics. However, the expected decay rates depend on coupling constants, whose effective values are under debate, and nuclear matrix elements (NMEs) that are poorly known [1]. Hence, it is crucial to gain a better understanding of the underlying theory in order to plan future experiments and to extract the beyond-standard-model physics from them.

I will discuss how the theory predictions can be improved either directly by investigating corrections to the $0\nu\beta\beta$ decay matrix elements, or indirectly by studying related processes that can be or have been measured. First, I will introduce our recent work on a new leading-order correction to the standard $0\nu\beta\beta$-decay NMEs in heavy nuclei [2]. Then, I will discuss the relation between $0\nu\beta\beta$-decay NMEs and other nuclear observables such as two-neutrino double-beta decay, double Gamow-Teller and double-gamma transitions. In addition, I will discuss the potential of ordinary muon capture as a probe of $0\nu\beta\beta$ decay, and discuss the results of our recent muon-capture studies [3].

[1] J. Engel, J. Menéndez, Rep. Prog. Phys. 80 (2017) 046301.
[2] L. Jokiniemi, P. Soriano, and J. Menéndez, Phys. Lett. B 823 (2021) 136720.
[3] L. Jokiniemi, T. Miyagi, S. R. Stroberg, J. D. Holt, J. Kotila, and J. Suhonen, arXiv:2111.12992.

Primary author(s) : JOKINIEMI, Lotta (University of Barcelona)

Presenter(s) : JOKINIEMI, Lotta (University of Barcelona)