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Ab initio studies on muon capture in light nuclei

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Muon capture is a nuclear-weak process in which a negatively charged muon, initially in an atomic bound state, is captured by the atomic nucleus, resulting in atomic number reduction by one and emission of a muon neutrino. Thanks to the high momentum transfer involved in the process, it is one of the most promising probes for the yet unobserved neutrinoless double-beta decay. To help the planned muon-capture experiments, reliable theory predictions are of paramount importance.

To this end, I will discuss recent progress in ab initio studies on muon capture in light nuclei, focusing in particular on the ab initio no-core shell model. These systematically improvable calculations are based on nuclear interactions derived from chiral effective field theory. The computed rates are found to be in good agreement with available experimental counterparts, motivating future experimental and theoretical explorations in light nuclei.

Keyword-1

Ab initio nuclear theory

Keyword-2

Muon capture

Keyword-3

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