

Nuclear Gamow-Teller excitation and beta decay study within modern density functional theory

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The Gamow-Teller (GT) transition could be studied by charge-exchange reactions in the Lab, while it also happens spontaneously in nature, and is the dominant transition in β -decay. β -decay half-lives set the time scale of the rapid neutron capture process, and hence are important for understanding the origin of heavy elements in the universe.

I will introduce our recent study on GT transition and beta-decay with the quasiparticle random phase approximation (QRPA) + quasiparticle vibration coupling (QPVC) model. By including the QPVC effect, more correlations beyond mean field level have been introduced, therefore, the GT resonance spreading width, which cannot be described by the QRPA model, can be reproduced. The overestimation of beta-decay half-lives in the QRPA model are also solved by the inclusion of QPVC effect.

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