

## Recent progress of shell-model calculations and quadrupole collective states

*Tuesday, 7 March 2023 16:30 (30 minutes)*

While the shell-model calculation is one of the most powerful models to investigate the nuclear structure, the explosive increase of the dimension of the shell-model Hamiltonian matrix hampers us from applying it to heavy nuclei. To overcome this difficulty, we developed the Monte Carlo shell model (MCSM) and its extension, the quasi-particle vacua shell model (QVSM). These methods enable us to study the quadrupole collective states of medium-heavy nuclei. I will

review the recent progress of the numerical aspects of shell-model study and its application to the shape phase transition of the Nd and Sm isotopes. The nuclear matrix element of the neutrinoless double beta decay will also be investigated.

### Experimental study on nuclear physics

**Presenter:** Prof. SHIMIZU, Noritaka (Tsukuba University)

**Session Classification:** Session 4