Universität Bielefeld Fakultät für Physik

Seminar

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Nuclear charge-exchange modes in Relativistic Nuclear Field Theory

Atomic nuclei are complex many-body systems where single-particle and collective degrees of freedom are deeply intertwined. The nuclear structure method which I will discuss is based on the relativistic meson-nucleon Lagrangian of quantum hadrodynamics and uses nuclear field theory to build inter-nucleon correlations emerging from the coupling between nucleons and emergent collective vibrations. Recently we have extended this formalism to the description of charge-exchange modes which have various applications in nuclear structure, particle physics and astrophysics. The particle-vibration coupling generates a time-dependent proton-neutron interaction, in addition to the static pion and rho-meson exchange, which induces fragmentation and spreading of the transition strength. Such dynamical effects are essential for an accurate description of giant resonances and low-energy modes, and have a great impact on the calculation of weak-interaction rates and on the quenching of the overall strength. I will present some applications to Gamow-Teller transitions and beta decay in mid-mass and heavy nuclei.

Thursday, 13.12.2018, 14:15 Uhr
Place: D6-135