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"Piston" mechanism in a time-dependent two-level model*

The "piston" mechanism concept [1] offers a unique motivation to use (p,2p) reactions to systematically study the evolution of neutron-neutron correlations in exotic neutron-rich nuclei. It seems clear that such a program will feature prominently in current and future rare-isotopes facilities worldwide.

In this work [2] we analyze the specific case of the high-energy one-proton knockout reaction on 19N leading to unbound states in 18C [1] in the framework of a time-dependent two-level mixing model. This simple formalism allows us to assess the validity of the piston mechanism and to suggest some indicators for its applicability. Differences in the time scales of the reaction, the lifetime and the oscillation period of the decaying state should be considered in relating the measured n-n correlations to the pairing properties of the ground state in the final nucleus.

While an extension of the two-level system to include more mixing states will be more realistic, our scenario captures the main physical ingredients of the problem.

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Topic

Theory

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