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# INTERWEAVING BETWEEN COLLECTIVE AND SINGLE-PARTICLE EXCITATIONS IN SN-120

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We address the question of how accurately theory can predict low-energy observables in spherical, superfluid nuclei, in terms of single-particle and collective degrees of freedom and of their couplings.

We present a unified calculation - based on selfconsistent Green's function theory (Nambu-Gor'kov equation) - of the leading many-body processes which determine the energy spectrum, the distribution of quasiparticle strength measured in one-nucleon transfer reactions, the splitting of 1 quasiparticle-1phonon multiplets, and the electromagnetic transition strength in  $^{120}\text{Sn}$ . At the same time, we compute the pairing gap, renormalized by the induced pairing interaction, and two-nucleon transfer cross sections. Our treatment goes beyond the traditional approach, in which these properties are calculated separately (and most often for system near closed shells), based on perturbative expressions (weak coupling).

We show that actual data concerning the above-mentioned observables put severe constraints on the values of collectivity, pairing and mean field properties. In this way, we obtain an accurate account of the experimental findings in  $^{120}\text{Sn}$ . In particular, we find that the coupling between independent-particles and collective excitations strongly renormalizes mean field properties (quasiparticle energies, pairing field) and opens other reaction channel enabling a more meaningful comparison with experimental data found to be in overall quantitative agreement.