

Two-Particle Transfer Reactions: A Key Tool for the Study of Phase Transitions in Nuclei

Andrea Vitturi

Dipartimento di Fisica e Astronomia, and INFN, Padova

Two-particle transfer reactions offer the possibility of clarifying the nature of the phase transitions that appear in chains of nuclei as a function of the number of protons or neutrons. This information can be viewed as a necessary complement to the one coming from the evolution of $B(E2)$'s values and energies of the first 2^+ state. Pair-transfer processes are known to be strongly influenced by the pairing interaction and therefore the information will come essentially from the population of the 0^+ states. The evolution of the population of these states will signal the position of the critical points and, even more important, the nature of the phase transitions (first order vs second order vs shape coexistence). Different structure approaches, ranging from the fully microscopic ones to those based on collective algebraic models, coupled to a proper description of the reaction mechanism are essential to reach this goal. As a specific examples I will discuss the shape phase transition in Zirconium isotopes.