

# Complementarity and Competitiveness of the Pairing and Quadrupole Interactions in the Microscopic Shell Model

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We explore the algebraic realization of the Pairing-Plus-Quadrupole Model /PQM/ in the framework of the Elliott's SU(3) Model with the aim to obtain the complementary and competing features of the two interactions through the relation between the pairing and the SU(3) bases. First, we establish a correspondence between the SO(8) pairing basis and the Elliott's SU(3) basis. It is derived from their complementarity to the same LS-coupling chain of the shell-model number-conserving algebra. The probability distribution of the SU(3) basis states within the SO(8) pairing states is also obtained and allows the investigation of the interplay between the pairing and quadrupole interactions in the Hamiltonian of the PQM. Some particular examples based on this SO(8)-SU(3) basis correspondence are applied for the build-up of a more elaborated pairing-plus-quadrupole model with a pair-scattering interaction. The description of various realistic  $N \sim Z$  nuclear systems is investigated in a SU(3)-symmetry-adapted basis within a model space of one and two oscillator shells.