MICROSCOPIC DESCRIPTION OF NEGATIVE PARITY STATES IN ^{154}Sm

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The structure of the negative-parity states in ^{154}Sm is studied within the framework of the fully microscopic proton-neutron symplectic model (PNSM) with Sp(12,R) dynamical algebra without involving additional degrees of freedom, inherent to other approaches to odd-parity states. A good description of the energy levels (Fig.1) of the $K = 0_1^-$ and $K = 1_1^-$ bands, as well as the reproduction of some energy splitting quantities which are usually introduced in the literature as a measure of the octupole correlations, is obtained. The microscopic structure of low-lying collective states with negative-parity in ^{154}Sm shows that practically there are no admixtures from the higher shells and hence the presence of a very good U(6) dynamical symmetry. Additionally, the structure of the collective states under consideration shows also the presence of a good SU(3) quasi-dynamical symmetry (Fig.2). The intraband ground state *B*(E2) and interband *B*(E1) transition strengths between the states of ground and $K=0_1^-$ bands are reproduced without the use of an effective charge.

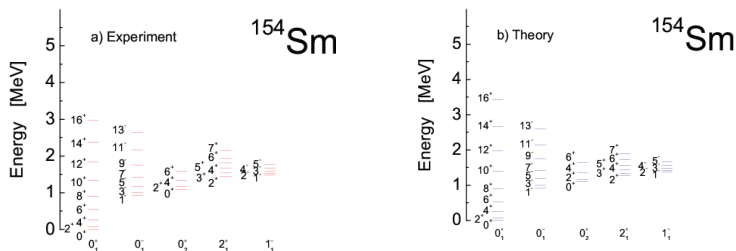

Fig. 1. Comparison of theoretical excitation energies ^{154}Sm with experiment.

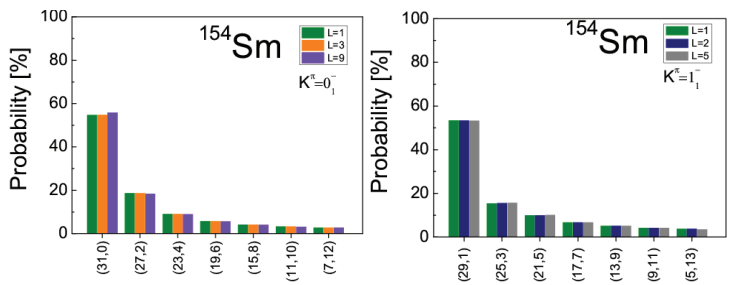

Fig. 2. Calculated SU(3) probability distributions for the wave functions of the $K = 0_1^-$ and $K = 1_1^-$ bands for three different angular momentum values.