

# NUCLEON-PAIR SHELL MODEL CALCULATIONS IN GENERALIZED SENIORITY BASIS

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In the phenomenological calculations, the interacting boson model (IBM) parameters are usually adjusted so as to give a best fit to a series of nuclei, with smoothly varying parameters. In general the observed variations in the parameters, as a function of  $N$  and  $Z$ , agree qualitatively with a zerothorder estimate based on the seniority scheme.

Several attempts have been made to calculate the model parameters from a more detailed microscopic approach [1]. One of the largest deviations from the simple seniority estimate was made in these calculations as coming from the coupling of the  $SD$  – subspace to the full shell model space. In these and subsequent calculations the effects of the neutron – proton interactions on the microscopic structure of the bosons have not been considered. Furthermore, in these calculations was neglected the influence of the Pauli principle on the  $d$ -boson structure. Calculations for deformed nuclei, using the Hartree-Fock-Bogoliubov method indicate that the microscopic structure of the bosons is strongly affected by the neutron-proton interaction.

In this paper a detailed calculation of the parameters will be presented by applying the nucleon-pair shell-model [2]. This model has the advantages that the diagonalization of the Hamiltonian is carried out exactly in the fermion space without any mapping procedure. For applying the nucleon-pair shell model to the ruthenium isotopes in  $SD$  – subspace. In this paper we attempt to study the effects of the single – particle energy splitting and the goodness of  $SD$  -subspace.

1. O.Scholten // Phys. Rev. C. 1983. V.28. P.1783.
2. Y.A.Luo, I.Q.Chen // Phys.Rev. C. 1998. V.58. P.589.