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Title: **Symmetry restorations in Skyrme mean-field calculations**

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The general framework of a method which permits to restore the rotational and particle number symmetries of wave functions obtained in Skyrme HF+BCS calculations has been presented recently[1]. This restoration is nothing but a projection of mean-field intrinsic wave functions onto good particle number and good angular momentum. The method allows also to *mix* projected wave functions. Such a configuration mixing is discussed for sets of HF+BCS intrinsic states generated in constrained calculations with suitable collective variables. This procedure gives collective states which are eigenstates of the particle number and the angular momentum operators and between which transition probabilities can be calculated. An application to ^{24}Mg will first be presented, to test the method. The mean-field wave functions are generated by axial quadrupole constraints. Theoretical spectra and transition probabilities are compared to the experiment.

An application to several neutron rich isotopes between oxygen and titan will then be presented. The effect of symmetry restoration on the shell closure at N=20 will be discussed in details. The ability of the method to describe excited states with large quadrupole deformations will be illustrated by a study of the excited 0^+ states in ^{16}O.

References

[1] A. Valor, P.-H. Heenen and P. Bonche, Nucl. Phys **A671** 145 (2000)

Invited talk.