Magnetic Moment Operators in Nuclear Collective Models

A. Góźdź, **A. Pędrak**,

Institute of Physics,Department of Mathematical Physics, University of Maria Curie-Skłodowska, pl. Marii Curie-Skłodowskiej 1, PL 20-031, Lublin, Poland

Nuclear collective models can be constructed in various ways. One of the most popular and effective method is the prescription given by Bohr and his collaborators many years ago. This method leads to constructions of nuclear collective spaces corresponding to the appropriate classical models.

However, there are a lot of problems to construct the appropriate form of observables in such spaces. An interesting set of such observables are the operators describing electric and magnetic multipole transitions. The electric multipole operators seem to be simpler for construction because they are dependent only on charge density distribution, the magnetic multipole operators are more difficult for construction because they depend on the electric current density which to some extend is a function of linear and angular momenta operators.

In the literature concerning nuclear collective models there are very few papers related to this problem. Usually the magnetic transition operators are obtained on a phenomenological basis. Their forms are rather a kind of guess usually based on expected transformation properties of these operators with a number of the so called giromagnetic coefficients which allow to fit the theoretical transition probabilities to the experimental data.

In this seminar we show a preliminary derivation of the magnetic multipole transition operators for collective models making use the Generator Coordinate Method with the generalized Gaussian Overlap Approximation. The results are disscussed in the context of structure of the collective space with a given symmetrization group.