

Test of the critical point symmetry X(5) in the A=180 mass region

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The investigation of nuclear phase transition phenomena is one of the exciting and very challenging topics in nuclear structure physics.

Dynamic symmetries at the critical point of shape phase transitions from spherical to axially deformed and from spherical to γ unstable nuclei, called X(5) and E(5), respectively, were introduced by F. Iachello [1,2]. Since then a lot of experimental and theoretical work has been devoted to this interesting phenomenon.

It has been found that the energy spectra and the relative transition strengths of $^{176-180}\text{Os}$ nuclei can be successfully reproduced by X(5) calculations. We will report on the investigations aiming for more stringent tests of the X(5) predictions for the neutron deficient $^{176-180}\text{Os}$ nuclei including also absolute transition probabilities. In two GASP experiments, lifetimes in $^{178,176}\text{Os}$ were measured for the first time using the plunger technique. In case of ^{178}Os , the resulting absolute B(E2) values agree very well with the X(5) predictions. Thus ^{178}Os is the first X(5) symmetric nucleus which was found far from the well established X(5) region at A=150 (N=90). The analysis of the experiment for ^{176}Os is still in progress. First preliminary results will be presented.

We will compare our latest experimental results with the X(5) calculations as well as with IBM and GCM fits.

[1] F. Iachello, Phys. Rev. Lett. 85, 3580 (2000)

[2] F. Iachello, Phys. Rev. Lett. 87, 52502 (2001)

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