

A Mechanism for Shape Coexistence

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A mechanism for shape coexistence is proposed. The mechanism is activated by large quadrupole-quadrupole interaction and involves the coupling of the nuclear shells 6-14, 14-28, 28-50, 50-82, 82-126 with the harmonic oscillator shells 2-8, 8-20, 20-40, 40-70, 70-112 respectively [1]. The outcome is, that the phenomenon may occur in certain islands on the nuclear map. The mechanism predicts without any parameters, that nuclei with either proton number (Z), whether neutron number (N) between 8, 18-20, 34-42, 60-72, 96-116 are candidates for shape coexistence [2]. Predictions for the energy and the shape of the 0_2^+ states will be presented. In the $N \sim 20$ island of inversion the mechanism predicts with the use of two global parameters, that an inversion of states occurs at $N = 18$.

References

- [1] A. Martinou et al., Proc. of 37-th International Workshop on Nuclear Theory, Nucl. Th., 37, Rila Mountains, Bulgaria (2018).
- [2] A. Martinou et al., Proc. of 27th Ann. Symp. of the H.N.P.S., arXiv: 1810.11860v1, (2018).