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Nuclear incompressibility from spherical and deformed nuclei

The problem of the nuclear incompressibility is a longstanding one. Deducing the incompressibility of nuclear matter from the compression modes of finite nuclei is not straightforward [1]. Whereas some consensus has been reached that from magic nuclei the value of the incompressibility K should be around 240 MeV, this number comes anyhow from the analysis of isoscalar giant monopole and dipole in magic nuclei only.

There are new measurements in open-shell nuclei that point to lower values of the nuclear incompressibility. Also, deformed nuclei are becoming object of increasing interest.

In axially deformed nuclei, the $K=0$ components of the monopole and quadrupole resonances are coupled. This fact is likely to affect the extraction of the nuclear incompressibility K , and we focus on the following questions in the present contribution: how does the monopole-quadrupole coupling affect the extraction of K from the monopole measurements in deformed nuclei? Is the incompressibility affected by deformation?

Theoretical arguments and results from quasi-particle Random Phase Approximation (QRPA) will be presented and critically discussed.

[1] U. Garg, G. Colò, “The compression-mode giant resonances and nuclear incompressibility”, Prog. Part. Nucl. Phys. (2018).

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