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Study of octupole vibrations in nearly spherical nuclei.

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Abstract content
 (Max 300 words)

Recent studies of double octupole states in ^{146}Gd have resulted in the need of deep studies to be done on two-phonon octupole excitation in ^{146}Gd . Octupole vibrations come closer to the ideal harmonic oscillator as a result of the larger number of particles participating in the motion and the weaker mixing of negative-parity states at low excitation energies.

Octupole vibrations are, however, much more complex than the other modes of vibrations, such as dipole and quadrupole, and little is known about them. This vibrational mode is a result of a vibrating nucleus that undergoes pear-shaped distortion, with “stem end” and the “blossom end” exchanging places periodically. In this project we study the octupole vibrations in the even-even nearly-spherical nucleus $^{146}\text{Gd}_{82}$. A state with $J=6+$ at 3485 keV has already been suggested in ^{146}Gd , and together with the finding, for the first time, of a $6+ \rightarrow 3- \rightarrow 0+$ cascade of $E3$ γ -ray transitions, this has been interpreted as the two-phonon octupole excitation.

So the aim of the project is to investigate this $6+$ state and other missing members of the octupole quartet in order to accurately characterize two-phonon octupole vibrations in nearly-spherical nuclei.

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 award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
 PhD)?

M.Sc

Main supervisor (name and email)
and his / her institution

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No

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