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Low-lying dipole and quadrupole states as new excitation modes

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We briefly review the properties of the low-lying dipole states known as Pygmy Dipole Resonance trying to select the main one which could define this new excitation mode. A good candidate seems to be the isoscalarisovector mixing which has been proved by both theoretical and experimental investigations. On the other hand, the study of the low-lying quadrupole states do not seem to provide clear evidence for a new excitation mode. The theoretical approaches used to investigate the quadrupole response reach different conclusions and the experimental data can only clearly establish the multipolarities of the states and their one-phonon character. Moreover, cross section calculations are not sensitive enough to disentangle between quadrupole states which are considered, in one of the theoretical approach, as due to different excitation mode.

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