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Dipole toroidal resonance: vortical properties, deformation impact, relation to pygmy mode

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Properties of the isoscalar dipole toroidal resonance (TR) in spherical and deformed nuclei are discussed using our recent results obtained within the self-consistent random phase approximation with Skyrme forces [1-4]. The TR strength functions, transition densities and velocity fields are inspected. The resonance is compared to other exotic isoscalar dipole modes (compression and pygmy) [1,2]. The main attention is paid to: i) possibility to use TR as a measure of the nuclear vorticity [3], ii) anomalous TR deformation splitting [4], iii) relation of the TR and pygmy dipole resonance [2], iv) perspectives of experimental observation of the TR.

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