

---

# DIPOLE TOROIDAL RESONANCE: VORTICAL PROPERTIES, DEFORMATION IMPACT, RELATION TO PYGMY MODE

V.O. Nesterenko, BLTP, Joint Institute for Nuclear Research, Dubna, Russia

---

J. Kvasil<sup>1</sup>, A. Repko<sup>1</sup>, P.-G. Reinhard<sup>2</sup>, W. Kleinig<sup>3,4</sup>

<sup>1</sup> Institute of Particle and Nuclear Physics, Charles University, Praha, Czech Republic

<sup>2</sup> Institut für Theoretische Physik II, Universität Erlangen, Erlangen, Germany

<sup>3</sup> Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, Dubna, Moscow region, Russia

<sup>4</sup> Technische Universität Dresden, Institut für Analysis, Dresden, Germany

Properties of the isoscalar dipole toroidal resonance (TR) [1,2] in spherical and deformed nuclei are discussed using recent results obtained within the self-consistent random phase approximation with Skyrme forces [3-6]. The TR strength functions, transition densities and velocity fields are inspected. The resonance is compared to other exotic isoscalar dipole modes (compression and pygmy) [3,4]. The main attention is paid to: i) possibility to use TR as a measure of the nuclear vorticity [5], ii) anomalous TR deformation splitting [6], iii) relation of the TR and pygmy dipole resonance [4], iv) perspectives of the TR experimental observation .

## REFERENCES

- [1] V.M. Dubovik and A.A. Cheshkov, Sov. J. Part. Nucl. v.5, 318 (1975).
- [2] S.F. Semenko, Sov. J. Nucl. Phys. v. 34, 356 (1981).
- [3] J. Kvasil, V.O. Nesterenko, W. Kleinig, P.-G. Reinhard, and P. Vesely, Phys. Rev. C84, 034303 (2011).
- [4] A. Repko, P.-G. Reinhard, V.O. Nesterenko, and J. Kvasil, Phys. Rev. C87, 024305 (2013).
- [5] P.-G. Reinhard, V.O. Nesterenko, A. Repko, and J. Kvasil, Phys. Rev. C89, 024321 (2014).
- [6] J. Kvasil, V.O. Nesterenko, W. Kleinig, and P.-G. Reinhard, Phys. Scripta, v.89, n.5, 054023 (2014).