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The role of the symmetry energy on Pygmy Dipole Resonance dynamics: from schematic models to transport approaches

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By considering different parameterizations with density of the symmetry energy is investigated theoretically the emergence and the nature of the low energy dipole response evidenced experimentally for various systems. We analyze the consistency of the predictions provided by a generalization of the Brown-Bolsterli schematic model with a density dependent particle-hole residual interaction and those based on self-consistent microscopic transport approaches using the Vlasov equation. In both cases an additional collective mode is signaled whose energy centroid is closer to the distance between two major shells and exhaust few percentages of Energy Weighted Sum Rule. From the sensitivity of EWSR to the density dependence of the symmetry energy is concluded that precise experimental determination of the PDR properties can settle important constraints on the behavior of the symmetry energy well below saturation.

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