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Microscopic theory of the gamma decay of nuclear giant resonances

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A microscopic formalism that allows the calculation of the gamma decay of nuclear excited states has been developed. In particular, it has been applied to the direct gamma decay of the Isoscalar Giant Quadrupole Resonance in ^{208}Pb to the ground state and to the low-lying octupole state, as well. The phonons are calculated within fully self-consistent RPA, while the calculation of the gamma decay width is performed at the lowest contributing order of the perturbation theory within the framework of the Nuclear Field Theory (NFT), including consistently the whole effective Skyrme interaction in the particle-vibration coupling vertex. The decay width to the lowest 3- state turns out to be only a few percent of the decay width to the ground state, as indicated by the experiment.

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