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ACOUSTIC SUPERRADIANCE

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ABSTRACT

This review deals with experimental and theoretical aspects of acoustic superradiance, and also spontaneous coherent radiation of elastic multipoles. By definition elastic multipoles are quantum mechanical objects that may radiate (absorb) phonons in the same way as electric (magnetic) multipoles radiate (absorb) photons. Elastic multipoles may be formed by nuclear spins in solids, paramagnetic ions in dielectric crystals, dislocations, domain walls in ferromagnetics and so on.

Peculiarities of sound superradiation excited by pulsed and stationary coherent external fields are considered. The creation of phonon avalanches as acoustic superradiance of inverted systems is analysed.