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ANALOGUE OF SUPERRADIANCE EFFECT IN ACOUSTIC BLACK HOLE IN THE PRESENCE OF DISCLINATION

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Acoustic analogue of a black hole has been a lot studied in the literature as a concrete laboratory model for probe several aspects of curved space quantum field theory.

In 1981, Unruh showed that if a fluid is barotropic and inviscid, and the flow of the fluid is irrotational, the equation of motion that fluctuation of the velocity potential of acoustic disturbance obeys, is identical to that of a minimally coupled massless scalar field propagating in an effective curved spacetime Lorentzian geometry, which can simulate an artificial black hole.

In this work we investigate the possibility of the acoustic analogue of a phenomenon like superradiance, that is, the amplification of a sound wave by reflection from the ergo-region of a rotating acoustic black hole in the fluid “draining bathtub” model in the presence of a disclination be amplified or reduced in agreement with the value of the deficit angle.

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