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Q-ball Superradiance

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Q-balls are non-topological solitons that coherently rotate in field space. We show that these coherent rotations can induce superradiance for scattering waves, thanks to the fact that the scattering involves two coupled modes. Despite the conservation of the particle number in the scattering, the mismatch between the frequencies of the two modes allows for the enhancement of the energy and angular momentum of incident waves. When the Q-ball spins in real space, additional rotational superradiance is also possible, which can further boost the enhancements. We identify the criteria for the energy and angular momentum superradiance to occur.

Collaboration / Activity

Collaboration

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