

Superradiant scattering in Bopp-Podolsky wormholes

Superradiance is a physical phenomenon involving the amplification of incident electromagnetic radiation through the extraction of energy from a system. This work analyzes the conditions for the occurrence of superradiance in electrically charged, spherical, and static wormholes, using Podolsky's generalized electromagnetic theory. Given a metric representing the wormhole and its electric field, minimal coupling is applied in the Klein-Gordon equation to determine the necessary conditions for superradiance in the solution of the radial equation. By using Maxwell's electromagnetic theory as a limiting case for generalized electrodynamics, we aim to estimate the parameter arising from the non-minimal coupling in Podolsky's theory. We estimate the reflection coefficient of an electromagnetic wave scattered by a wormhole in Bopp-Podolsky electrodynamics. Preliminary results are presented based on the approximation $\Delta_{00} \approx \Delta_{11}$ in the Bopp-Podolsky wormhole metric, justified by the low relative percentage error between the terms Δ_{00} and Δ_{11} of the metric components.

Primary authors: Dr MIQUELE DE MELO, Cássius Anderson (Unifal-MG); FRIZO, Diego Augusto; Dr RICHARTZ, Maurício (Universidade Federal do ABC)

Session Classification: Poster Presentation