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Absorption of Massless Scalar Waves by Ayón-Beato-García Regular Black Holes

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Along the last decades, several regular black hole (BH) solutions, i.e., singularity-free BHs, have been proposed and associated to nonlinear electrodynamics models minimally coupled to general relativity. Within this context, it is of interest to study how those nonlinear-electrodynamics-based regular BHs (RBHs) would interact with their astrophysical environment. We investigate the propagation of a massless test scalar field in the background of an electrically charged RBH solution, obtained by Eloy Ayón-Beato and Alberto García. Using a numerical approach, we compute the absorption cross section of the massless scalar field for arbitrary values of the frequency of the incident wave. We compare the absorption cross sections of the Ayón-Beato and García RBH with the Reissner-Nordström BH, showing that they can be very similar in the whole frequency regime.

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