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From Quarks to Cosmos

Contribution ID: **82**   Type: **Poster (virtual)**

Scattering properties of charged black holes in nonlinear and Maxwell's electrodynamics

We investigate the scattering properties of a massless scalar field in the background of a charged Ayón-Beato-García regular black hole solution. Using a numerical approach, we compute the differential scattering cross section for arbitrary values of the scattering angle and of the incident wave frequency. We compare our results with those obtained via the classical geodesic scattering of massless particles, as well as with the semiclassical glory approximation, and show that they present an excellent agreement in the corresponding limits. We also show that Ayón-Beato-García and Reissner-Nordström black hole solutions present similar scattering properties, for low-to-moderate values of the black hole electric charge, for any value of the scattering angle.

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