Abstract

Title: Black hole as a particle accelerator
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Banados, Silk and West (BSW) demonstrated that an extremal Kerr black hole can act as a particle accelerator with arbitrarily high center-of-mass energy (E_{CM}). We study the collision of two general particles with different masses falling freely from rest in the equatorial plane of a rotating ABG black hole near the event horizon and find that the E_{CM} of two colliding particles is arbitrarily high when one of the particles takes a critical value of angular momentum in the extremal case, whereas for nonextremal case E_{CM} for a pair of colliding particles is generically divergent at the inner horizon, and explicitly studying the effect of charge Q on the E_{CM} for ABG black hole. In particular, our results in the limit $Q\rightarrow 0$ reduce exactly to \emph{vis-$\grave{a}$-vis} those of the Kerr black hole.