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Accretion Disk Dynamics in the Vicinity of a Four-Dimensional Einstein-Gauss-Bonnet Black Hole

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Abstract
As one of the predictions of general relativity, black holes have the problem of singularity. There are various approaches to solving this problem, and Einstein-Gauss-Bonnet (EGB) black hole in four dimensions is one of them. The lack of electromagnetic radiation makes black holes difficult to observe. This is where the key role of accretion disks around black holes is revealed as the sole source of their electromagnetic radiation. Studying and observing accretion disks around black holes will be effective in better understanding black holes and their effects on the surrounding space-time. Therefore, in this article, we have studied standard thin accretion disks around EGB black holes in four dimensions. We have obtained the radiant energy, derivative of luminosity, temperature, and conversion efficiency of accretion mass to radiation and compared it with Schwarzschild's black hole. The results show that the conversion efficiency of accretion mass to radiation by four-dimensional EGB black holes is higher than that of Schwarzschild black holes. Also, the four-dimensional EGB black hole emits more energy than the classical Schwarzschild black hole.

Keywords: black hole, Gauss-Bonnet, accretion disk, Schwarzschild

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