



Contribution ID: 18

Type: **Poster**

Shadow Cast by a Rotating Black Hole

Tuesday, December 12, 2023 5:14 PM (1 minute)

In this paper, we study the shadow cast by a rotating black hole which turns out to be a dark region covered by a deformed circle. We then derive the relevant photon orbits and discuss the effects of black hole parameters on the silhouette of the shadow. We observe the change in the size as well as the shape such as deviation from the perfect circle, of the shadow with variation in the black hole parameters. In view of the optical properties of the black hole, the shadow region is supposed to be equal to the high energy absorption cross section. According to this perspective, we also explore the rate of energy emission. Moreover, we introduce plasma background and discuss its influence on the nature of the shadow, such as shape, size as well as the rate of energy emission.

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Session Classification: Accretion Processes