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Event horizon of a black hole merger in cubic gravity

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The evolution of the event horizon in the merger of a large black hole and a small compact object can be studied exactly in the extreme mass ratio regime by tracing back a specific set of null geodesics. While this type of analysis has already been conducted for various scenarios in General Relativity, a similar study in modified theories of gravity is still missing. We study how higher derivative corrections of gravity influence the dynamics of the merger, focusing in the case where the small compact object is a black hole in cubic gravity. In particular, we determine the impact of the theory's coupling parameter on the relevant physical observables that characterize the fusion, such as the merger duration and the distortion of the small companion.

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