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Black holes in a modified gravity: Hawking radiation and cosmological implications

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There are observations supporting the plausible modification to Einstein gravity, while the exact theory of gravity in the strong field regime is indeed under debate. We obtain a new black hole solution in an f(R)-gravity-based modified gravity. Such a black hole evaporates faster by Hawking radiation compared to that in the Einstein gravity, i.e. the Kerr black hole.
One of its implications is in the consideration of primordial black holes (PBHs) as dark matter. The exact constituents of dark matter are a big puzzle, where PBHs are argued to be a potential candidate. The faster evaporation of PBHs in the modified gravity puts a strict constraint on contributing PBHs to dark matter. This further widens the debate of the origin on dark matter.

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