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Searching for isolated black holes in the Milky Way

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Primordial Black Holes (PBHs) have been proposed as a Dark Matter (DM) candidate. Even if they constitute only a component of the DM, their detection would have major implications for fundamental Physics. If a component of the DM is in the form of PBHs, we expect a significant portion of this black hole population to be present at the center of our Galaxy, a region rich of dense molecular clouds. Black holes located within a cloud will accrete the dense interstellar gas, which will emit radiation during the process. In this work, we study the possibility of detecting isolated accreting black holes in the Milky Way through this radiation. We focus on the radio and X-ray bands, considering existing catalogs and future experimental prospects. To model the accretion, we adopt the state-of-the-art model of Park-Ricotti, backed up by numerical simulations. We consider different mass functions for the PBHs and compare the results with those obtained for the black hole population of astrophysical origin.
Partially based on arXiv:2012.10421

Keywords

Primordial black holes; accretion; Milky Way

Collaboration

other Collaboration

Subcategory

Theoretical Results

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