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Dark and shiny dresses around astrophysical and primordial black holes

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The birth of gravitational wave astronomy has been a major recent breakthrough in physics. The recent discovery of gravitational wave signals from merger events of massive binary-black-hole (BBH) systems have prompted a renewed debate in the scientific community about the existence of primordial black holes (PBHs) of O(1-100) solar masses. These objects may have formed in the early Universe and could constitute a significant portion of the elusive dark matter that, according to standard cosmology, makes up the majority of the matter content in the universe.
I will review the most recent development of this field, with particular focus on the mass window of interest for the LIGO and Virgo gravitational observatories.
I will first discuss in detail the most updated computations of the expected merger rate of a hypothetical subdominant population of primordial black holes, taking into account the impact of the dark matter "dresses" that are expected to form around these objects.
In the second part, I will present the prospects of discovery for both this hypothetical PBH population and the guaranteed population of astrophysical isolated black holes in our Galaxy, based on the radio and X-ray emission from the interstellar gas that is being accreted onto them (the "shiny dress"). A future detection will be possible thanks to the expected performance of forthcoming radio facilities such as SKA and ngVLA.
I will mention the possible consequences of such discovery on the existence of other dark matter candidates.

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