## Phenomenology 2019 Symposium



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## Microlensing of X-ray Pulsars: a Method to Detect Primordial Black Hole Dark Matter

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Primordial black holes (PBHs) with a mass from  $10^{-16}$  to  $10^{-11} M_{\odot}$  may comprise 100% of dark matter. Due to a combination of wave and finite source size effects, the traditional microlensing of stars does not probe this mass range. In this talk, we point out that X-ray pulsars with higher photon energies and smaller source sizes are good candidate sources for microlensing for this mass window. Among the existing X-ray pulsars, the Small Magellanic Cloud (SMC) X-1 source is found to be the best candidate because of its apparent brightness and long distance from telescopes. We have analyzed the existing observation data of SMC X-1 by the RXTE telescope (around 10 days) and found that PBH as 100% of dark matter is close to but not yet excluded. Future longer observation of this source by X-ray telescopes with larger effective areas such as AstroSat, Athena, Lynx, and eXTP can potentially close the last mass window where PBHs can make up all of dark matter.

## Summary

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