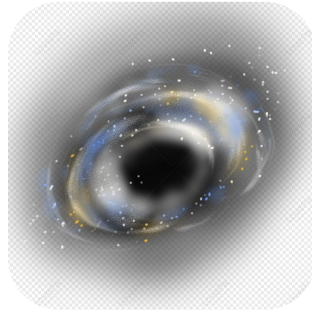


Bremsstrahlung Effect in Hyperbolic Encounters of Primordial Black Holes in Dark Matter Spikes

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Working with Dr. Sinha and Badal Bhalla

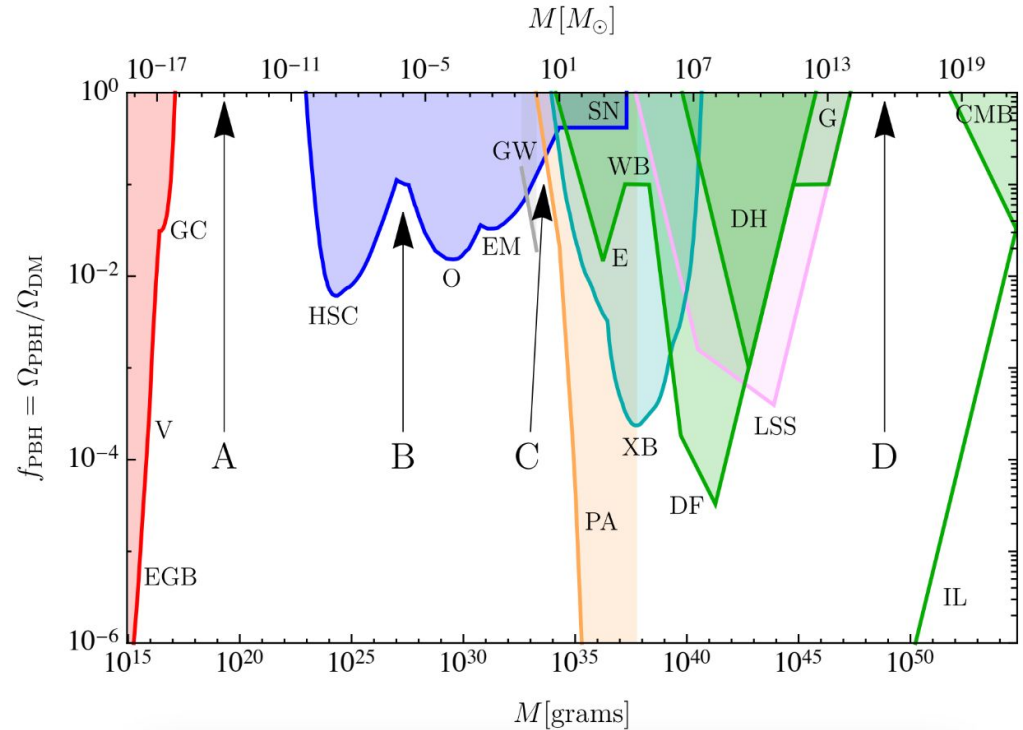
What Are Primordial Black Holes?

- Predicted by Hawking and Carr in the 1970s
- Hypothesized to be created during inflation
- LIGO found gravitational waves from the merging of two 30 Solar Mass black holes
- Could solve some outstanding problems in physics



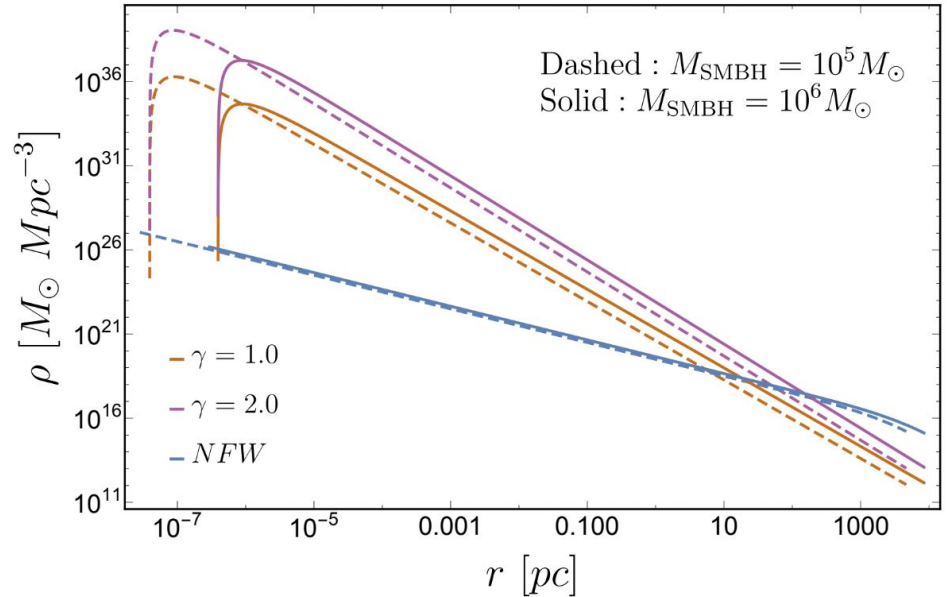
Primordial Black Holes as Dark Matter Candidates

- Primordial Black Holes have been considered as a Dark Matter candidate
- Hawking radiation constraints the lowest mass region and microlensing excludes the middle ranges
- So, we are looking at Primordial Black Holes in the asteroid/lunar mass region (A)



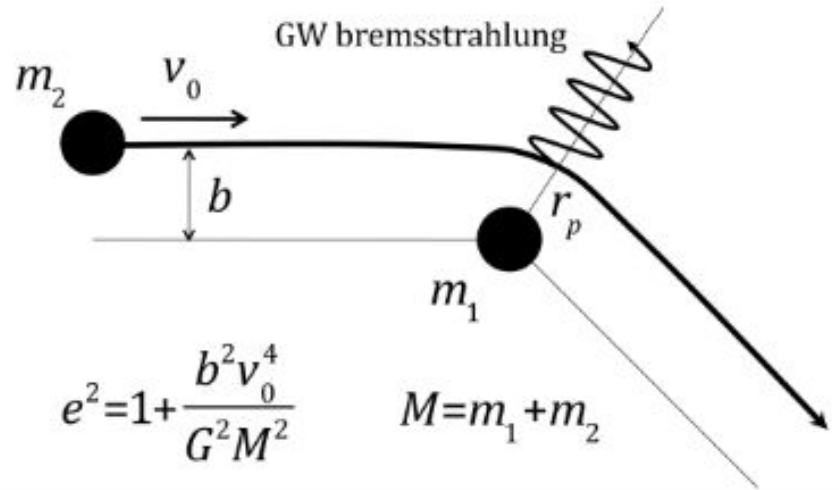
Dark Matter Spike Near Supermassive Black Holes

- Standard theory of dark matter distribution in halos is Navarro-Frenk-White profile
- We are looking at a Dark Matter spike distribution predicted by Gondolo and Silk



Hyperbolic Encounters of Primordial Black Holes

- When two black holes pass each other hyperbolically, a gravitational wave is released
- We are looking at the stochastic background of the sum of all of these hyperbolic encounters in the dark matter spike



Why?

- The sum of all these hyperbolic interactions will hopefully be detectable by LISA
- LISA will be launched in the 2030s to detect a new spectrum of gravitational waves
- Will reveal more about Primordial Black Holes, constraining them further or showing evidence towards their existence

