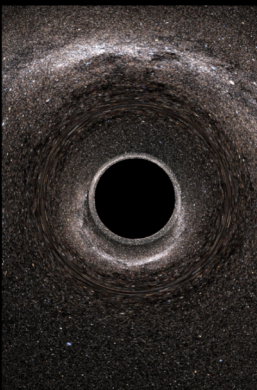


Cosmological Black Holes

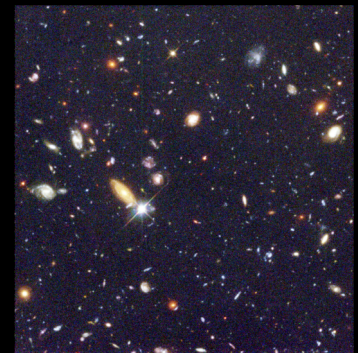
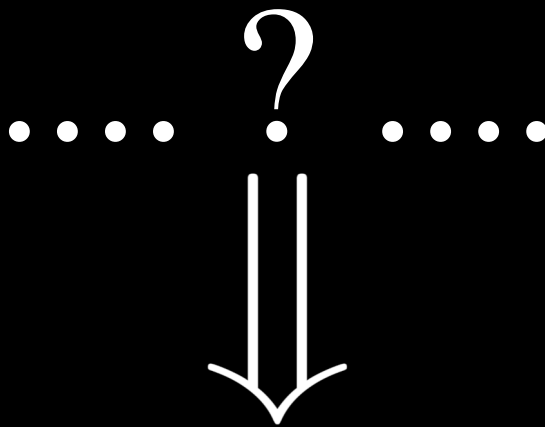
| Zachary S. C. Picker | University of Sydney | AstroDark-2021 |

Cosmologically-embedded black holes have unique phenomenology.

Could they comprise the dark matter?



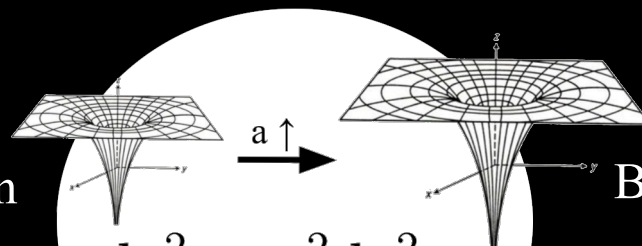
Black Hole Metric



FLRW Metric

Thakurta Metric

Hawking Radiation
arXiv:2103.02815



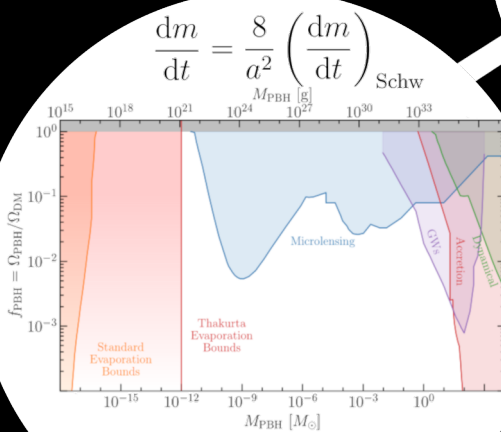
Binary Abundance
arXiv:2008.10743

$$ds^2 = a^2 ds_{schw.}^2$$

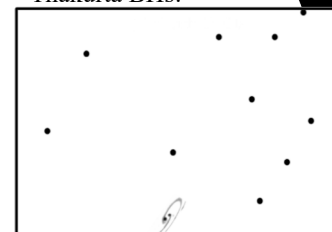
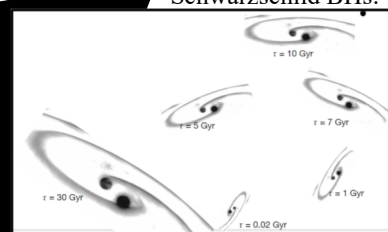
- Pathology-free
- Valid in radiation-domination
- growing effective *black hole* horizon

$$m_{\text{Misner-Sharp}} \approx 2ma$$

At matter-radiation equality:



Quick evaporation \Rightarrow
Asteroid-mass BH dark matter is constrained



Little binary formation \Rightarrow
strong LIGO BH dark matter bounds escaped