GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN

Unterstützt von / Supported by
Alexander von Humboldt
Stiftung/Foundation

USING BLACK HOLES TO CONSTRAIN THE STRING AXIVERSE

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WITH DEMIRTAS, LONG, MARSH, McALLISTER, STOTT

2103.06812, 2011.08693

PATRAS 2021

TRIESTE

$$\mathcal{L} = -\frac{1}{8\pi^2} M_{\rm pl}^2 K_{ij} g^{\mu\nu} \partial_\mu \theta^i \partial_\nu \theta^j$$

$$+ \sum_{a=1}^{\infty} \Lambda_a^4 \left\{ 1 - \cos\left(\sum_i Q_i^a \theta^i + \sigma^a \right) \right\}$$

$$0$$

DEMIRTAS+ 2018, 2020

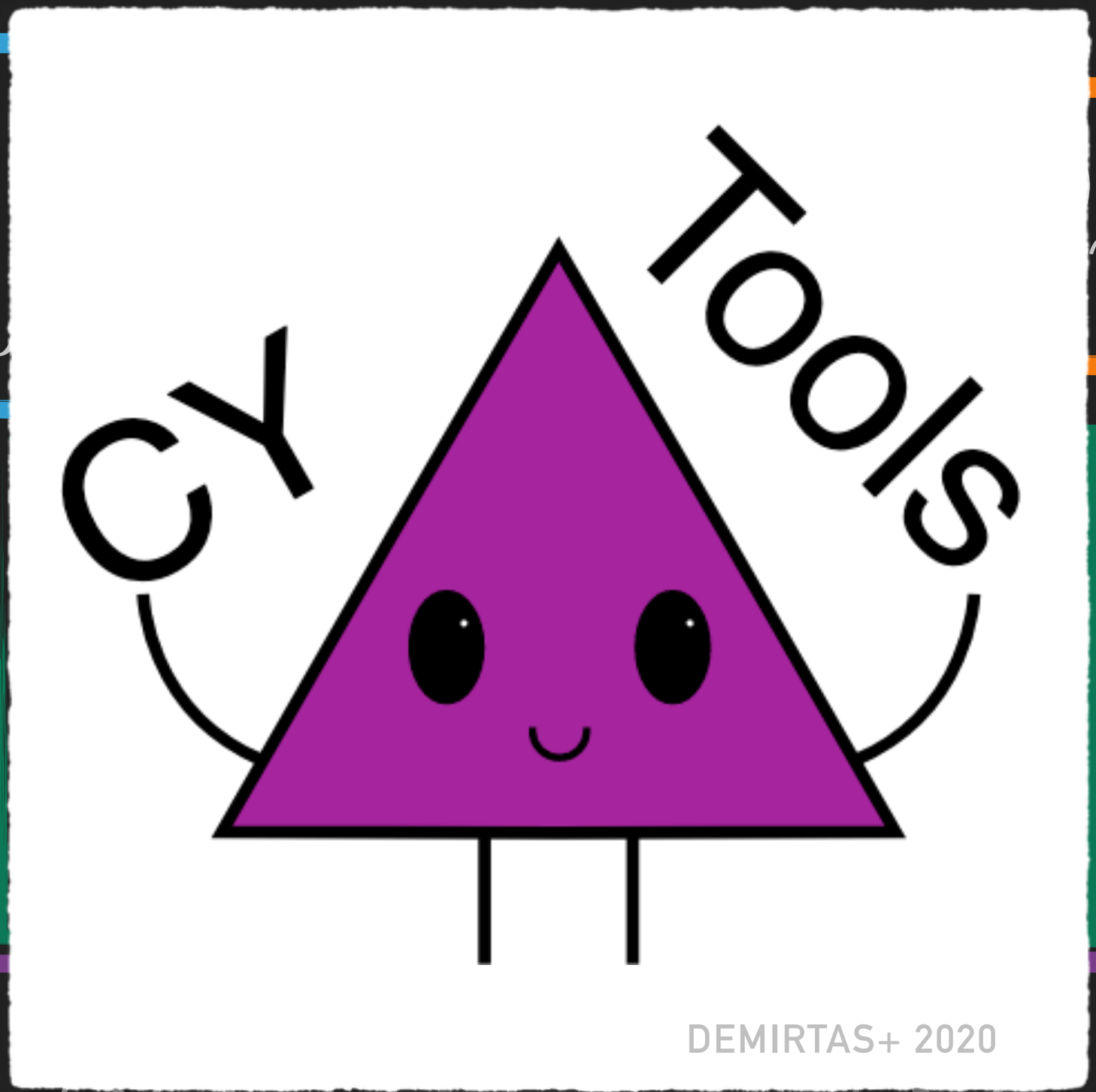
$$\theta_i := \int_{D_i} C_4$$

$$K_{ij} = \partial_i \partial_j \mathcal{K}$$

$$Q_a^i = \begin{pmatrix} q_\alpha^i \\ q_\beta^i - q_\gamma^i \end{pmatrix}$$

$$\Lambda_a \sim \exp\left(-2\pi Q_i^a \tau^i\right)$$

$$\theta_i := \ldots i\partial_j K$$

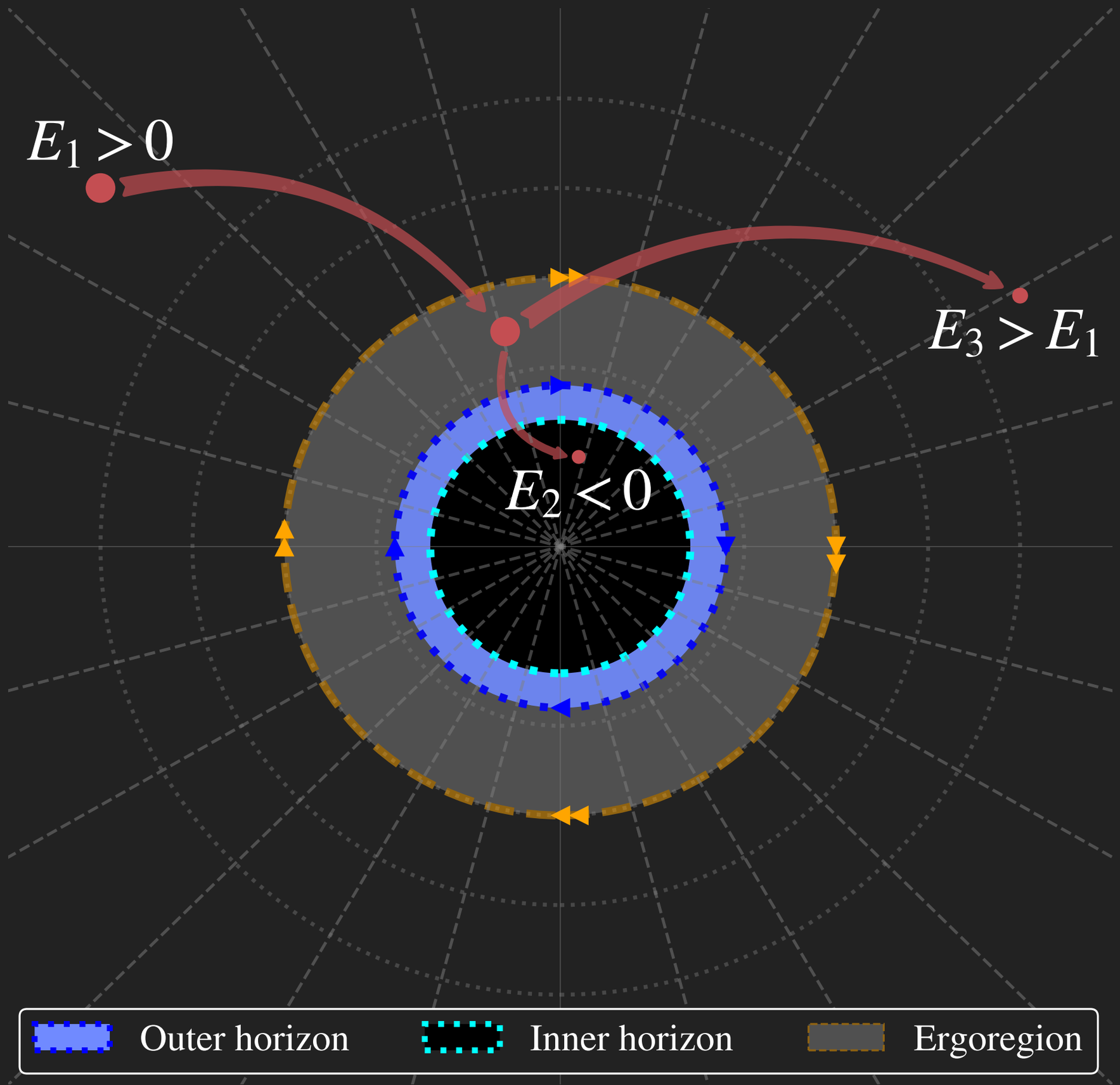


$$\Lambda_a \sim \exp\left(-2\pi \mathcal{Q}_i \tau^i\right)$$

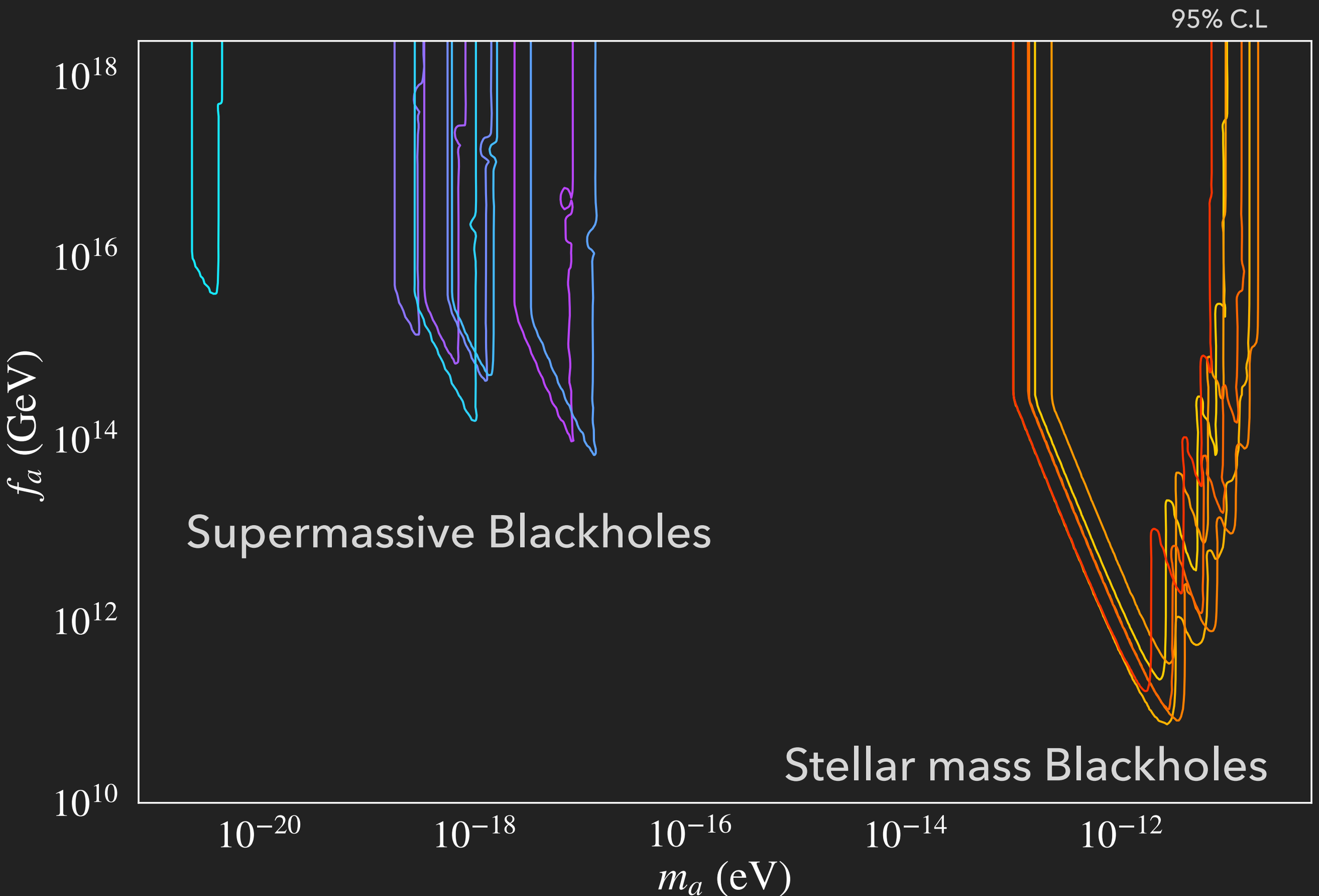
DEMIRTAS+ 2020

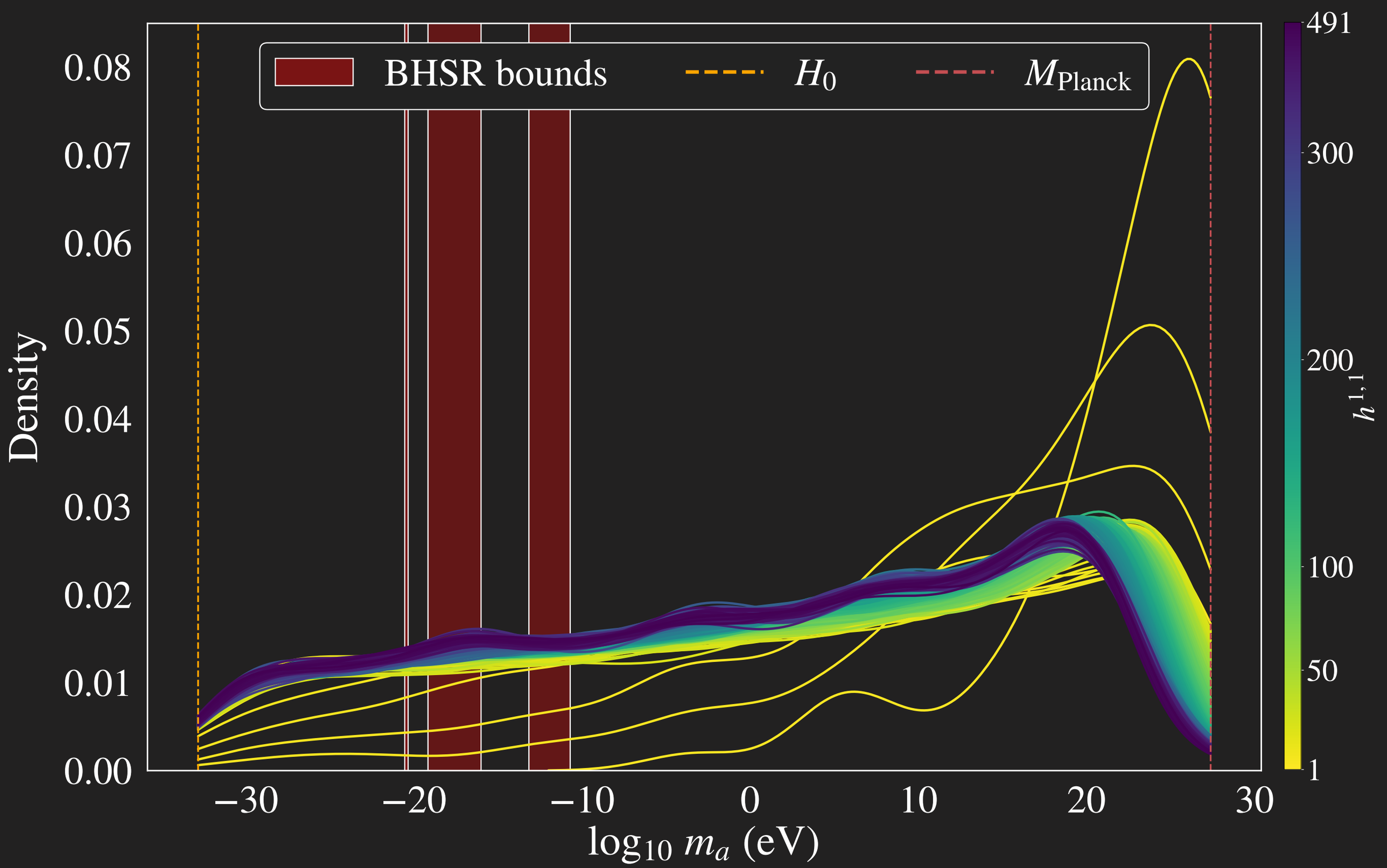
BLACKHOLE SUPERRADIANCE

PENROSE
1969

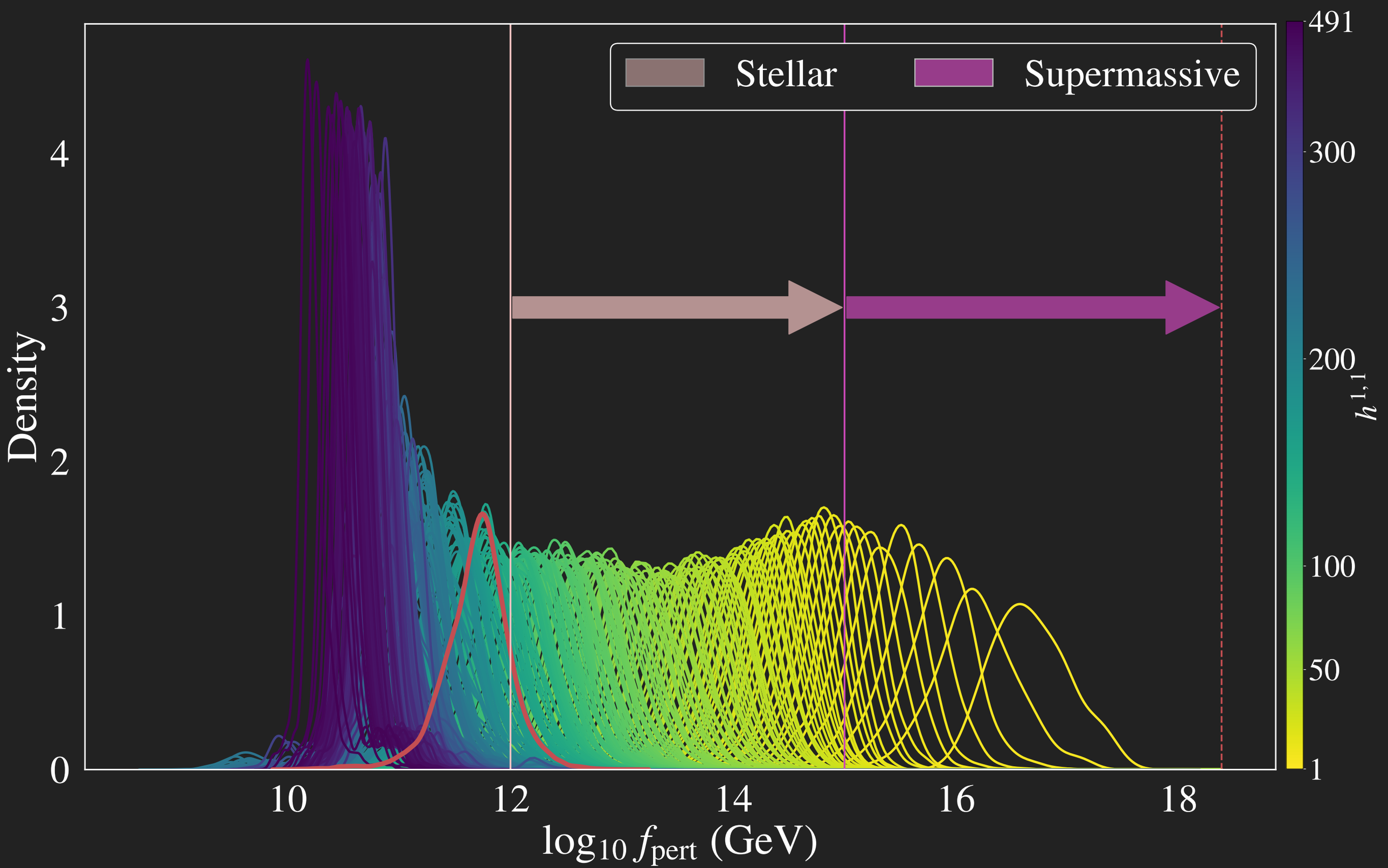


BLACKHOLE SUPERRADIANCE




BHSR bounds
H_0
M_{Planck}
Density
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
−30
−20
−10
0
10
20
30
$\log_{10} m_a$ (eV)
491
300
200
100
50
1
$h^{1,1}$

DECAY CONSTANTS



BHSR CONSTRAINS THE KS AXIVERSE