Universal Black hole solutions for all F(R) Gravitational theories

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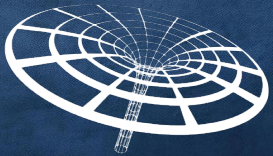
1) Extending GR ! F(R) gravity

$$= \frac{1}{16} \int dx^4 \sqrt{g}\, R \quad ! \quad \text{General Relativity}$$

- Orbits X
- Gravitational lensing X
- Gravitational waves X
- Many more... X



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- Orbits X
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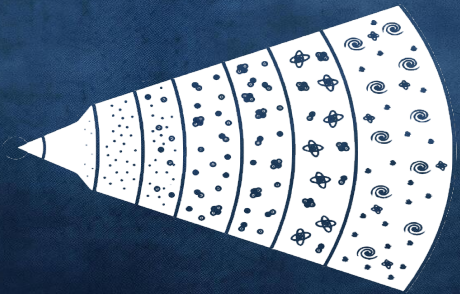
- Gravitational waves X
- Many more... X
- Singularities ✗
- Dark matter ✗
- H0 tension ✗
- Inflation ✗

1) Extending GR ! F(R) gravity

$$= \frac{1}{16} \int dx^4 \sqrt{g} \, (R + F(R)) \quad ! \quad \text{F(R) gravity}$$

Inflation, H0 tension, ...



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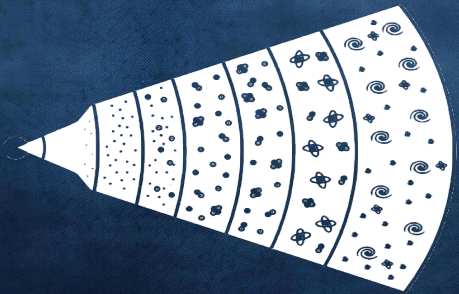
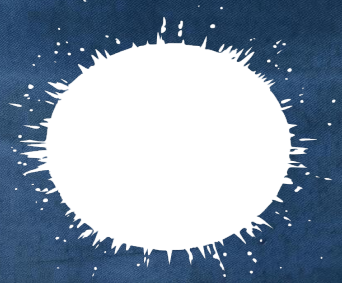


Dark matter(?), Dark energy(?), ...

Black hole thermodynamics



QFT curved spacetimes shows that the temperature is [1]

$T_H = \frac{}{2} \quad ! \quad$ = *Surface gravity*

Going further down the rabbit hole, if there is a temperature then there must(?) be entropy [2]

$$S = \frac{1}{8} \int_{+} d \quad \frac{p}{h} \frac{L}{R} \quad !$$

= *Bifurcation surface*

= *Binormals to*

[1] Hawking, S. W. (1974). "Black hole explosions?". Nature.

[2] Wald, Robert (2001). "The thermodynamics of black holes". Living Reviews in Relativity.

Quasinormal modes

Regge-Wheeler $! \; g \quad = \overline{g} \quad + h$

$$h \quad = e^{\; i ! t} \sin \quad \frac{@}{@} P_l(\cos \;) \; \text{w} \; \begin{pmatrix} 0 & 0 & 0 & h_0(r) \\ 0 & 0 & 0 & h_1(r) \\ 0 & 0 & 0 & 0 \\ h_0(r) & h_1(r) & 0 & 0 \end{pmatrix}$$

(Axial perturbations of the metric)[a]

[a] Regge, T., Wheeler, J. A. (1957). Stability of a Schwarzschild singularity. Physical Review

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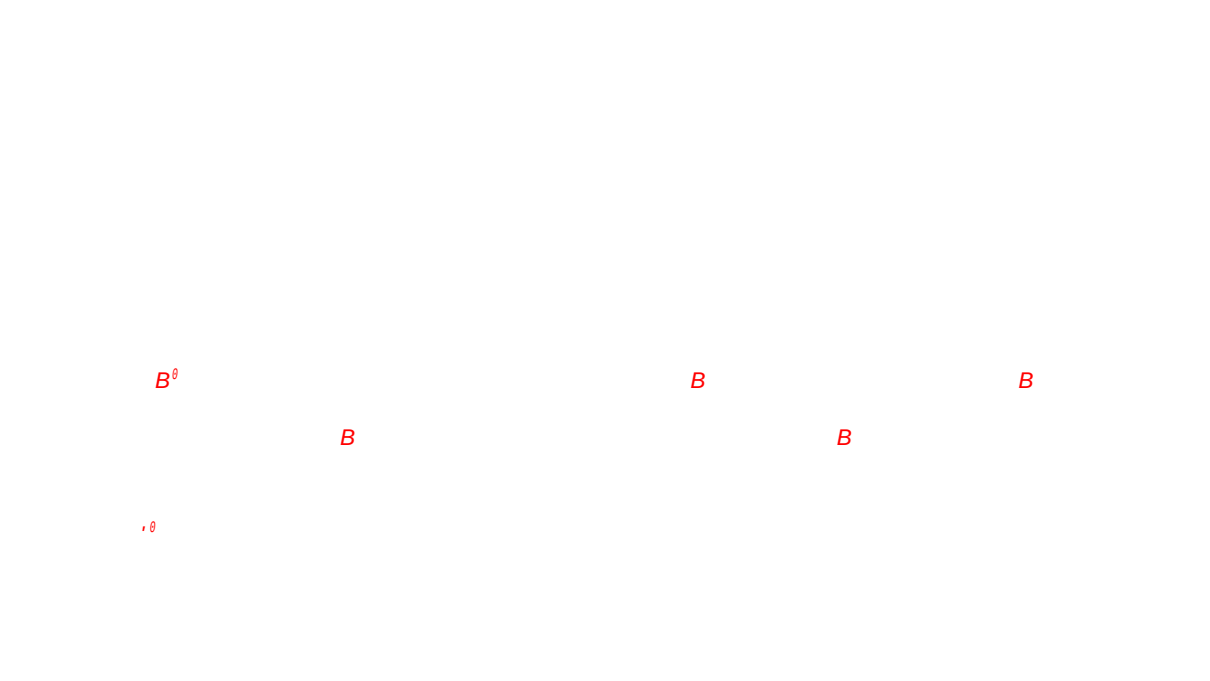
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