QUADRUPOLE MOMENT OF SPINNING MICROSTATE GEOMETRIES

Cea

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FRENCH STRING MEETING 2025 TOURS



[Strominger, Vafa,'96; Bena, Warner, Mathur et al] What is a microstate ? Why studying them ?

No horizon, no singularities

[Hawking,'76] **No information paradox**

MOTIVATION



What is the quadrupole moment and why computing it ?

LISA experiment

Black Hole microstate vs classical object



MOTIVATION





 $M_2 > 0$





4D Kerr-Taub-bolt - fluxes

Leads to discrete sets of allowed (m, α)

Compute the quadrupole moment :

- Method of Asymptotically Cartesian Coord
- Read from the metric M_2 :

 $g_{tt} = -1 +$

METHOD [Bena, Giusto, Ruef, Warner, '09]

Study the regularity conditions : Closed Timelike Curves, positive definite metric

rdinates (AC-N)
[Bena, Mayerson, '20]

$$\frac{2M}{r} + \frac{c_1}{r^2} + \frac{(3\cos^2\theta - 1)M_2 + c_2\cos\theta + c_3}{r^3}O\left(\frac{1}{r^4}\right)$$

RESULTS AND PERSPECTIVES





Do the microstates have same range of charges, mass of real Black Holes ?

THANK YOU!