Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **4139** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Marginally Outer-Trapped Tori in maximally extended Schwarzschild spacetime

Tuesday 28 May 2024 10:45 (15 minutes)

The behaviour of apparent horizons throughout a black hole merger process is an unresolved problem. Numerical simulations have provided insight to the fate of the two horizons. By considering marginally outer-trapped surfaces (MOTSs) as apparent horizon candidates, self-intersecting MOTSs were found in the merger process and play a key role in the merger evolution [arXiv:1903.05626]. A similar class of self-intersecting MOTSs have then been investigated in explicitly known black hole solutions, including the Schwarzschild solution [arXiv:2005.05350; 2111.09373; 2210.15685]. We present findings from our investigations of MOTSs in the maximally-extended Kruskal black hole spacetime [arXiv:2312.00769]. The spacetime contains an Einstein-Rosen bridge that connects two asymptotic regions. This allows for novel MOTSs that span both asymptotic regions with non-spherical topology, such as that of a torus. These MOTSs are comparable to those found in numerical simulations and have unexpected behaviour with regards to their stability spectrum.

Keyword-1

mots

Keyword-2

black hole

Keyword-3

merger

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Session Classification: (DTP) T1-2 Black Holes I | Trous noirs I (DPT)

Track Classification: Technical Sessions / Sessions techniques: Theoretical Physics / Physique théorique (DTP-DPT)