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(G*) Self-intersecting marginally outer trapped surfaces (MOTSs) in rotating spacetimes

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Self-intersecting marginally outer-trapped surfaces (MOTSs) have been found to play a vital role in binary black hole merger processes through numerical simulations [Pook-Kolb et. al. arXiv:1903.05626]. The search for such exotic MOTSs can also be found in analytical black hole solutions, such as the simplest (Schwarzschild) black hole [Booth et. al., arXiv:2005.05350]. Ongoing work continues to investigate the physical implications of the self-intersecting behaviour in spherically-symmetric spacetimes [Hennigar et. al., arXiv:2111.09373]. The previous techniques for finding self-intersecting MOTSs are restricted to non-rotating spacetimes. This talk makes use of the extension of the MOTS-finding method to rotating (axisymmetric) spacetimes for any dimension that was developed in [Booth et. al., arXiv:2210.15685] and which is presented at this congress in the talk by Sarah Muth. Such spacetimes are astrophysically relevant, as black holes found in our universe are expected to carry angular momentum. It is shown that the MOTSs found bears many similarities with those found in spherically-symmetric spacetimes, while exhibiting previously unseen behaviours.

Keyword-1

black hole

Keyword-2

MOTS

Keyword-3

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