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(G*) The many marginally outer trapped surfaces of Schwarzschild spacetime

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Despite the constant stream of black hole merger observations, black hole mergers are not yet fully understood. The phenomenon seems simple enough, but the details of how the two apparent horizons end up as one horizon is unclear due to the non-linear nature of the merger process. Recent numerical work has shown that there is a merger of self-intersecting Marginally Outer-Trapped Surfaces (MOTS) during the black hole merger. Following papers have investigated further into MOTS in a simpler and static scenario, that of a Schwarzschild black hole. Such cases require less machinery and are solved with everyday computers. Those numerical calculations show an infinite number of self-intersecting MOTS hidden within the apparent horizon, as well as open surfaces (MOTOS). The importance of Schwarzschild MOTS are not to be undermined due to its relative simplicity as such MOTS describe an extreme-mass-ratio black hole merger, where one of the black holes is far more massive than the other. In this talk, I will discuss the current understanding of black hole mergers as have numerically been shown and my work investigating Schwarzschild MOTS in maximally-extended Kruskal-Szekeres coordinates.

Authors: KUNDURI, Hari (Memorial University of Newfoundland); BOOTH, Ivan (Memorial University); CHAN, Kam To Billy (Memorial University of Newfoundland); HENNIGAR, Robie; MUTH, Sarah

Presenter: CHAN, Kam To Billy (Memorial University of Newfoundland)

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