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The fate of apparent horizons in a binary black hole merger

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The common picture of a binary black hole merger is the "pair of pants"diagram for the event horizon. However, in many circumstances, such as those encountered in numerical simulations, the event horizon may be ill-suited and it is more practical to work with quasi-local definitions of black hole boundaries, such as marginally outer trapped surfaces (MOTS). The analog of the pair of pants diagram for the apparent horizons remains to be fully understood. In this talk, I will discuss the complete picture for the merger of two axisymmetric black holes. I will begin by introducing new classes of MOTS present in Brill-Lindquist initial data. I will then discuss the role played by these and related surfaces in understanding the final fate of the apparent horizons of the initial two participants in the merger.

Author: HENNIGAR, Robie

Co-authors: BOOTH, Ivan (Memorial University); Dr POOK-KOLB, Daniel (Max Planck Institute for Gravitational Physics (Albert Einstein Institute),)

Presenter: HENNIGAR, Robie

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