

1053-83-285

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Aspects of marginally trapped surfaces in 2+1 and higher dimensional gravity. Preliminary report.

Marginally outer trapped surfaces (MOTSs) have long been associated with the development of singularities in spacetime and the existence of black holes. In recent years a number of mathematically rigorous properties of MOTSs have been established. We will discuss some of these properties in connection with the existence of black holes in 2+1 dimensions, as well as the topology of black holes in higher dimensions. The work in 2+1 dimensions is joint with Kristin Schleich and Don Witt. (Received September 07, 2009)