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*Geometry of horizon merger during a binary black hole collision*

In both rigorous mathematical and numerical studies, it is most common to represent the boundary of a black hole as a marginally outer trapped surface (MOTS): a geometric structure that is closely related to (and sometimes even coincides with) a minimal surface in Riemannian geometry. As a result of gravitational wave observations, there is now a great interest in binary black hole collisions. In such a collision, the two MOTSs representing the original pair of black holes merge into a single MOTS representing the final black hole. It is only in the last few years that, through a combination of analytical and numerical techniques, this process has started to be understood. This talk will review what we now know about that process and consider the many exotic MOTSs that mediate the merger. In particular I will point out how many of the “mild genericity” assumptions from theorems aiming to govern that behaviour turned out to be neither mild nor generic.