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Black hole mergers and bifurcations of marginally outer trapped surfaces

It is well known that a marginally outer trapped surface evolves smoothly in time if 0 is not an eigenvalue of its stability operator; otherwise it may bifurcate. In this talk I will present geometric criteria for saddle-node, transcritical and pitchfork bifurcations to occur as the initial data is varied. These results apply to any variation of the initial data, not just time evolution. Using these criteria, I will show the existence of an infinite sequence of pitchfork and transcritical bifurcations along the inner horizon in the Reissner-Nordström spacetime, as the charge varies between zero and the extremal value. This talk represents joint work with Liam Bussey and Hari Kunduri.