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*Trapped Surfaces and Seiberg–Witten invariants*

We prove existence of trapped surfaces in a certain class of asymptotically flat initial data sets of 3 or more dimensions. This class is characterized by a new smooth invariant, the maximal Yamabe invariant, defined by smooth compactification of the asymptotically flat manifold. These results apply to spacetimes admitting a Cauchy surface of nonpositive maximal Yamabe invariant with initial data that satisfies the dominant energy condition. For 4-dimensional asymptotically flat initial data, the sign of the maximal Yamabe invariant can be related to the Seiberg–Witten invariants of the smooth compactification. In particular, 5-dimensional spacetimes with smooth Cauchy surfaces with non-trivial Seiberg–Witten invariants must contain a trapped surface.