On Formation of Trapped Surfaces in General Relativity

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In this talk, I will present two results regarding the formation of trapped surfaces in general relativity. The first is a simplified approach to Christodoulou’s monumental result which showed that trapped surfaces can form dynamically by the focusing of gravitational radiation from past null infinity. We extend the methods of Klainerman-Rodnianski, who gave a simplified proof of this result in a finite region. The second result extends the theorem of Christodoulou by allowing for weaker initial data but still guaranteeing that a trapped surface forms in the casual domain. In particular, we show that a trapped surface can form dynamically from initial data which is merely "large" in a scale-invariant way. The second result is obtained jointly with Luk.