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**Nishanth Abu Gudapati\*** ([nishanth.gudapati@yale.edu](mailto:nishanth.gudapati@yale.edu)), Department of Mathematics, 10 Hillhouse Avenue, New Haven, CT 06511. *A Positive-Definite Energy Functional for Axially Symmetric Maxwell's Equations on Kerr and Kerr-de Sitter Black Holes.*

An important PDE tool in proving decay in the context of the black hole stability problem is a positive-definite quantity corresponding to the perturbations. However, due to the ergo-region of Kerr (and Kerr de- Sitter) black hole spacetimes, the existence of such a quantity is quite subtle in general. In this talk, we shall discuss the proof of that there exists a positive-definite and conserved energy functional for axially symmetric Maxwell's equations propagating on Kerr (and Kerr-de Sitter) black holes. Joint work in part with V. Moncrief (Yale). (Received September 14, 2017)