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## **Spacetime Harmonic Functions and the Mass of 3-Dimensional Asymptotically Flat Initial Data for the Einstein Equations**

*Monday, 5 July 2021 18:30 (20 minutes)*

We give a lower bound for the ADM mass of 3-dimensional asymptotically flat initial data sets for the Einstein equations. The bound is given in terms of linear growth ‘spacetime harmonic functions’ in addition to the energy-momentum density of matter fields, and is valid regardless of whether the dominant energy condition holds or whether the data possess a boundary. A corollary is a new proof of the spacetime positive mass theorem for complete initial data or those with weakly trapped surface boundary. The proof has analogy with both the Witten spinorial approach as well as the marginally outer trapped surface (MOTS) method of Eichmair, Huang, Lee, and Schoen. This is joint work with Sven Hirsch and Marcus Khuri.

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