A GREEN'S FUNCTION PROOF OF THE POSITIVE MASS THEOREM

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In this talk, we describe a new monotonicity formula holding along the level sets of the Green's function of a complete one–ended asymptotically flat manifold of dimension 3 with nonnegative scalar curvature. Using such a formula, I will obtain a simple proof of the following result:

Theorem 1. *Let (M, g) be a 3-dimensional, complete, one–ended asymptotically flat manifold with nonnegative scalar curvature. Then, the ADM mass of (M, g) is nonnegative,*

$$m_{\mathrm{ADM}} \geq 0.$$

Moreover, $m_{\mathrm{ADM}} = 0$ if and only if (M, g) is isometric to $(\mathbb{R}^3, g_{\mathbb{R}^3})$.

See also [1].

This is a joint work with Virginia Agostiniani, Lorenzo Mazzieri.

References

[1] V. Agostiniani and L. Mazzieri and F. Oronzio, *A Green's function proof of the Positive Mass Theorem*, ArXiv Preprint Server–ArXiv:2108.08402, 2021.

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