

# Massive Klein-Gordon Fields on Hyperboloidal Slices

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The treatment of future-null infinity has been a long standing problem in numerical relativity studies. Not only is it required to extract the Gravitational-Wave signals, but also to study a wide variety of other phenomena unambiguously. Examples include the cosmic censorship conjecture, critical collapse and the self force problem. One of the major challenges in including future null-infinity in the numerical domain comes in dealing with arbitrary matter content. In this talk I will discuss an ongoing attempt to deal with massive fields at null infinity in Minkowski spacetime. This involves studying the decay of the fields and the development of numerical methods capable of dealing with formally singular terms that appear in the field equations.

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- [1] Klainerman S., *Communications on Pure and Applied Mathematics*, **46**, 2, p. 137-144, (1993)
- [2] D. Hilditch, E. Harms, M. Bugner, H. Rüter, B. Brügmann, *Class. Quant. Grav.*, **35**, 5, p. 055003, (2018)
- [3] Winicour, J., *J. Math. Phys.*, **29**, p. 2117-2121, (1988)
- [4] B. S. DeWitt and R. W. Brehme, *Annals Phys.*, **9**, p. 220-259, (1960)
- [5] E. Poisson, A. Pound, I. Vega, *Living Rev. Rel.*, **14**, p. 7, (2011)
- [6] Tom M. Apostol, *Calculus: One-Variable Calculus with An Introduction to Linear Algebra*, vol. 1, 2nd ed., Wiley, 1991, ISBN: 978-0-471-00005-1
- [7] G. Calabrese, L. Lehner, O. Reula, O. Sarbach, M. Tiglio, *Class. Quant. Grav.*, **21**, p. 5735-5758, (2004)