

## Scattering for wave equations with sources and slowly decaying data

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We construct solutions with prescribed radiation fields for wave equations with polynomially decaying sources close to the lightcone. In this setting, which is motivated by semilinear wave equations satisfying the weak null condition, solutions to the forward problem have a logarithmic leading order term on the lightcone and non-trivial homogeneous asymptotics in the interior of the lightcone. The backward scattering solutions we construct from knowledge of the source and the radiation field at null infinity alone are given to second order by explicit asymptotic solutions which satisfy novel matching conditions close to the light cone. This requires a delicate analysis close to the light cone of the forward solution with sources on the light cone. We also relate the asymptotics of the radiation field towards space-like infinity to explicit homogeneous solutions in the exterior of the light cone for slowly polynomially decaying data corresponding to mass, charge and angular momentum in the applications. The somewhat surprising discovery is that these data can cause the same logarithmic radiation field as the source term. This requires a delicate analysis of the forward homogeneous solution close to the light cone using the invertibility of the Funk transform. This is joint work with Volker Schlue.

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