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**Hans Lindblad\*** (lindblad@math.jhu.edu), Baltimore, MD , and **Volker Schlue** (volker.schlue@unimelb.edu.au), Melbourne, Australia. *Scattering from infinity with singular asymptotics for wave equations satisfying the weak null condition.*

We prove global existence results from scattering data at null infinity for semilinear wave equations satisfying the weak null condition. The data at infinity is given in terms a radiation field which is assumed to decay at a rate consistent with the forward problem. We then prove the existence of a global solution with the prescribed asymptotics that decays spatially at the same rate. The proof relies on a fractional Morawetz estimate for the backward problem which allows us to exploit the decay of the radiation field and on the construction of suitable approximate solutions from the scattering data.

The results are motivated and apply to systems of wave equations with semilinear terms that appear in Einstein's equations in harmonic gauge. (Received January 19, 2021)