

# Time-weighted estimates in Lorentz spaces and self-similarity for wave equations with singular potentials

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We show time-weighted estimates in Lorentz spaces for the linear wave equation with singular potential. As a consequence, assuming radial symmetry on initial data and potentials, we obtain well-posedness of global solutions in critical weak- $L^p$  spaces for semilinear wave equations. In particular, we can consider the Hardy potentials in weak- $L^{n/2}$ . Self-similar solutions are obtained for potentials and initial data with the right homogeneity. Our approach relies on performing estimates in the predual of weak- $L^p$ .