

Abstract

We show that the finite time type II blow up solutions for the energy critical nonlinear wave equation

$$\square u = -u^5$$

on \mathbb{R}^{3+1} constructed in Krieger, Schlag, and Tartaru (“Slow blow-up solutions for the $H^1(\mathbb{R}^3)$ critical focusing semilinear wave equation”, 2009) and Krieger and Schlag (“Full range of blow up exponents for the quintic wave equation in three dimensions”, 2014) are stable along a co-dimension one Lipschitz manifold of data perturbations in a suitable topology, provided the scaling parameter $\lambda(t) = t^{-1-\nu}$ is sufficiently close to the self-similar rate, i. e., $\nu > 0$ is sufficiently small. This result is qualitatively optimal in light of the result of Krieger, Nakamishi, and Schlag (“Center-stable manifold of the ground state in the energy space for the critical wave equation”, 2015). The paper builds on the analysis of Krieger and Wong (“On type I blow-up formation for the critical NLW”, 2014).