

# POINTWISE CONVERGENCE OF THE KLEIN-GORDON FLOW

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ABSTRACT. In this talk, we will deal with a nonlinear pointwise convergence theory for the case of the 3d cubic Klein-Gordon equation. In particular, we address the following question, considering the initial datum in  $H^s(\mathbb{T}^3) \times H^{s-1}(\mathbb{T}^3)$ : which is the minimal regularity  $s$  such that the solution of the aforementioned equation converges, as time goes to 0 and almost everywhere in space, to the initial datum? Departing from the well-known result for the linear setting (that is, such pointwise convergence holds true if and only if  $s > 1/2$ ), we answer to the question in two different ways that lead us to two different minimal regularities:

- (i) In a deterministic sense, we prove that the nonlinear counterpart of the aforementioned result for the linear flow holds true if and only if  $s > 1/2$ .
- (ii) In a probabilistic sense, we lower the regularity assumption to  $s > 0$  through a suitable randomization of the initial data.

This is a joint work with Renato Lucà.

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*Key words and phrases.* Klein-Gordon equation, maximal estimates, smoothing estimates, random data.