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Title: Counterexamples disproving pointwise convergence for solutions of dispersive PDE's

Abstract: In 1980 Carleson posed a question on the minimal regularity of an initial data function in a Sobolev space that implies pointwise convergence for the solution of the linear Schrödinger equation. After progress by many authors, this was recently resolved (up to the endpoint) by Bourgain, whose counterexample construction for the Schrödinger maximal operator proved a necessary condition on the regularity, and Du and Zhang, who proved a sufficient condition. In this talk, we will briefly sketch how Bourgain's counterexamples can be constructed from first principles. Then we will describe a new flexible number-theoretic method for constructing counterexamples, which proves a necessary condition for pointwise convergence, for a broad class of dispersive PDE.