

Solving initial-boundary value problems for nonlinear Schrödinger equations.

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In this talk we discuss the well-posedness of initial-boundary value problems for nonlinear Schrödinger equations with cubic and quadratic nonlinearities in one and higher dimensions. We begin by solving the corresponding forced linear problem via the Fokas method and describe the linear estimates one can obtain when the forcing is in Bourgain spaces, the initial data in Sobolev spaces, and the boundary data in spaces that reflect boundary regularity. Then, we continue by describing the multilinear estimates which are suggested by norms of the forcing and which are used for proving that the iteration map defined by the Fokas solution formula is a contraction. We conclude by stating the well-posedness results we obtain using our approach. The talk is based on work with A. Fokas, D. Mantzavinos and F. Yan.

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