1097-35-158 **Barbara Prinari*** (bprinari@uccs.edu), Department of Mathematics, University of Colorado Colorado Springs, 1420 Austin Bluffs Pkwy, Colorado Springs, CO 80918. *Inverse Scattering Transform for the focusing NLS equation with fully asymmetric boundary conditions.*

We present the inverse scattering transform (IST) for the focusing nonlinear Schrödinger equation: $iq_t = q_{xx} + 2|q|^2 q$, with non-zero boundary conditions $q(x,t) \sim q_{l/r}(t) = A_{l/r} e^{i\theta_{l/r}(t)}$ as $x \to \mp\infty$ in the fully asymmetric case.

The direct problem is shown to be well-posed for NLS solutions $q(x,t)$ such that $q(x,t) - q_{l/r}(t) \in L^{1,1}(\mathbb{R}^{\mp})$ with respect to x for all $t \geq 0$, for which analyticity properties of eigenfunctions and scattering data are established. The inverse scattering problem is formulated both via (left and right) Marchenko integral equations, and as a Riemann-Hilbert problem on a single sheet of the scattering variables $\lambda_{l/r} = \sqrt{k^2 + A_{l/r}^2}$, where k is the usual complex scattering parameter in the IST. The time evolution of the scattering coefficients is then derived, showing that, unlike the case of solutions with the same amplitude as $x \to \pm\infty$, here both reflection and transmission coefficients have a nontrivial time dependence.

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