1060-35-142   **Barbara Prinari***, Department of Mathematics, University of Colorado at Colorado Springs, 1420 Austin Bluffs Pkwy, Colorado Springs, CO 80918. *Inverse Scattering Transform (IST) for the Multicomponent Nonlinear Schrodinger (NLS) Equation Under Non-Vanishing Boundary Conditions.* Preliminary report.

This talk reports on the development of the IST for vector NLS under nonvanishing boundary conditions (NBCs) for an arbitrary number N of components.

For the scalar NLS equation ($N = 1$) with NBCs, the scattering parameter k "lives" on a two-sheeted Riemann surface. When $N > 1$, a complication arises: $2(N - 1)$ out of the $2(N + 1)$ eigenfunctions are not analytic on either sheet of the Riemann surface, and one has to suitably complete the basis. The $N = 2$ case (Manakov system) is somehow special. The IST for this system under NBCs was developed in 2006 by Ablowitz et al and the basic idea was to use the adjoint scattering problem to construct two additional analytic eigenfunctions. This technique, however, does not admit an obvious generalization to arbitrary N.

In order to complete the basis of analytic eigenfunctions for the general N-component scattering problem, we generalize the approach suggested by Beals, Deift and Tomei [1988] for general scattering and inverse scattering on the line but developed under the assumption of vanishing BCs. The key step is the introduction of a fundamental tensor family as solutions of a suitable scattering problem associated to the given one, with each tensor analytic on either one or the other sheet of the Riemann surface. (Received March 28, 2010)