
PETER PERRY, University of Kentucky
The Davey-Stewartson Equation Revisited

This is joint work with Peter Topalov (Northeastern University) The Davey-Stewartson II (DS II) equation is a completely integrable dispersive equation in two dimensions which describes surface waves on shallow water and is a completely integrable generalization of the one-dimensional cubic nonlinear Schrödinger equation. Its solution by inverse scattering was developed by Beals-Coifman, Fokas-Ablowitz, Fokas-Sung, and Sung in the 1980's and 1990's but the rigorous theory does not fully describe the behavior and stability of soliton solutions. In this talk we will review the Beals-Coifman $\bar{\partial}$ -method and our recent result on global well-posedness for DS II in the Sobolev space

$$H^{1,1}(\mathbb{R}^2) = \{u \in L^2 : \nabla u, |x|u \in L^2\}$$

by the method of inverse scattering. We will also discuss asymptotics of solutions and stability of solitons.