



McMaster University



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University of Waterloo

## THE FIELDS INSTITUTE FOR RESEARCH IN MATHEMATICAL SCIENCES

### DIRECTOR'S SEMINAR

#### SPEAKER:

**MICHAEL WEINSTEIN**  
University of Michigan

On the Topic:

#### "Nonlinear Bound States"

We shall survey some results and directions of research on nonlinear dispersive partial differential equations. Many such equations (e.g. K-dV, nonlinear Schroedinger, nonlinear Klein - Gordon, Abelian-Higgs,...) can be viewed as infinite dimensional Hamiltonian systems.

Nonlinear bound states are a class of finite energy solutions. Examples are: solitons, solitary waves, kinks, breathers, and vortices. Nonlinear dispersive systems (both integrable and nonintegrable) often exhibit universal behavior, in which nonlinear bound states participate. Two types of universality are:

- (1) an arbitrary initial state, as time advances, decomposes into nonlinear bound states plus dispersive radiation, and
- (2) a solution, initially well behaved, blows up and becomes singular after some finite time, with the structure of the blowing up solution identifiable as a "scaled" nonlinear bound state.

**Monday, March 22, 1993**

**4:00 pm, room 3018**

at

**The Fields Institute**

Refreshments at 3:00 pm Common Room

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