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THE FIELDS INSTITUTE FOR RESEARCH IN MATHEMATICAL SCIENCES

COLLOQUIUM IN DYNAMICAL SYSTEMS

SPEAKER:

DARRYL HOLM
Los Alamos National Laboratory

On the Topic:

"A BiHamiltonian Shallow Water Equation with Peaked Solitons"

We derive a new dispersive shallow water equation that is biHamiltonian and thus possesses an infinite number of conservation laws in involution. The equation is obtained by using an asymptotic expansion directly in the Hamiltonian for Euler's equations in the shallow water regime. Numerical experiments demonstrate that a typical compact initial condition breaks up into a train of solitons. These solitons are traveling wave solutions that vanish at infinity and have a discontinuity in the first derivative at their peak. We find the N-soliton solution and study its elastic collision properties both analytically and numerically. The dynamics of the N-soliton solution is equivalent to geodesic motion on a surface with delta-function singularities in its Gaussian curvature.

Thursday, March 18, 1993

2:30 pm, room 3018

at

The Fields Institute

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Supported by the **Ministry of Colleges and Universities of Ontario** and the **Natural Sciences and Engineering Research Council of Canada**