CPNLW-09 " *Solitons in their Roaring Forties* "

Coherence and Persistence in Nonlinear Waves

January 6-9, 2009, Observatoire de la Côte d'Azur, Nice, France

Forty years ago, when Zabusky and Kruskal analysed the long wave limit of a chain of nonlinearly coupled masses and springs, they obtained the Korteweg de Vries equation. Their numerical calculations showed elastic collisions between pulses. Then Gardner, Greene, Kruskal and Miura spelled out an explicit method to solve the KdV equation as an initial-value problem, for arbitrary initial data. At the same time Lax introduced his pair formalism establishing a firm ground for integrable partial differential equations. This lead to the discovery by Zakharov and Shabat and Ablowitz, Kaup Newell and Segur of the integrability of the nonlinear Schrodinger and sine-Gordon equations.

Since then, nonlinear waves have been extensively studied using a combination of analysis and computations. The main models can be found in all realms of physics like hydrodynamics, optics, plasmas, solid-state physics and superconductivity. They are now extending to biology and physiology. More than the discovery of new integrable equations, it is the universality and robustness of these main models with respect to perturbations that developed the field. This is true for both continuous and discrete equations. These unique systems allow a strong reduction in the numbers of variables needed for their description. It is then interesting to look at real waves and experimental data from this point of view.

To celebrate the **40th anniversary of the discovery of the Lax pair formalism** and **draw new perspectives for the field**, this workshop will bring together theorists and experimentalists from many different backgrounds interested in tackling nonlinear waves in practical problems. General continuous or discrete, integrable or close to integrable systems will be considered with an emphasis on real and new applications. Specific topics will cover inhomogeneities, linear-nonlinear couplings, singular solutions, special domain geometry, topological excitations, parameter identification and controlled motion of pulses.

The members of the scientific advisory committee are listed below. They will help us to select lectures if necessary. ***Lecturers are urged to present talks that are easily accessible to colleagues from various fields*** and ***all newcomers are encouraged to give their own perspective.***

The workshop will take place from Tuesday January 6 2009 to Friday January 9th 2009 at the University of Nice in southern France.

The registration fee is 200 euros, it includes coffee breaks, lunches, and social activities (in particular the conference dinner on Thursday, 8th of Jan). ***This fee will increase up to 250 euros for registration performed after Dec. 15th !***

Organizers:

Jean Guy Caputo, Laboratoire de Mathematique, Insa de Rouen, Rouen, France.

Didier Clamond, Laboratoire Jean Alexandre Dieudonne, Universite de Nice Sophia-Antipolis, Nice, France.

Jean Claude Fernandez, C4I, Campus d'Archamps, France.

Gilbert Reinisch, observatoire de la Côte d'Azur, Dépt «*Cassiopée*», Nice, France.

Majid Taki, Université de Lille 1, Lille, France.

Local organisation committee:

Olivier Legrand, Carlos Montès, Fabrice Mortessagne : Laboratoire de physique de la matière condensée, Universite de Nice Sophia-Antipolis, Nice, France,

Sylvie Szeles & Thierry Passot : observatoire de la Côte d'Azur, Dépt «*Cassiopée*», Nice, France

Scientific advisory committee – Chairman: Harvey Segur

M. Ablowitz, University of Colorado, Boulder, USA.

G. Agrawal, University of Rochester, USA

N. Akhmediev, Australian National University, Canberra, Australia

I. Barashenkov, University of Cape-town, South-africa.

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Y. Gaididei, Institute of theoretical Physics, Kiev, Ukraine.

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