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M. Remoissenet M. Peyrard (Eds.)

Nonlinear Coherent Structures in Physics and Biology

Proceedings of the 7th Interdisciplinary Workshop
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This Book is Dedicated to the Memory of Stephanos Pnevmatikos

PREFACE

This volume contains the text of most of the contributions presented at the 7th Interdisciplinary Workshop on "Nonlinear Coherent Structures in Physics and Biology", which was held on the campus of the Université de Bourgogne, Dijon, France, from June 4 to 6, 1991, with about 80 participants.

As with earlier workshops in this series, the purpose of this workshop was to bring together scientists concerned with recent developments and various aspects of nonlinear structures and to provide a forum to stimulate the exchange of ideas among scientists of different backgrounds, including physicists, mathematicians, biologists and engineers.

Nature provides many examples of coherent nonlinear structures and waves, and these have been observed and studied in various fields, ranging from fluids and plasmas through solid state physics to chemistry and biology. Among these beautiful nonlinear phenomena, localized wave packets, solitary waves and solitons, which propagate without dispersing, are the simplest structures, and these provide a continuing source of fascination for the student of nonlinearity. In fact, many real systems sharing the same underlying nonlinear phenomenon can be modeled by the same basic equations, leading to an understanding of their dynamic properties. This correctly indicates the importance of maintaining the interdisciplinary feature of nonlinear science.

The proceedings reflect the remarkable progress in understanding and modeling nonlinear phenomena in various systems, and these new developments show that the study of nonlinear coherent structures is in a state of healthy growth. Experimental, numerical and theoretical activities are interacting in various studies, which we present according to the following classification :

- magnetic and optical systems
- biosystems and molecular systems
- lattice excitations and localized modes
- two-dimensional structures
- theoretical physics
- mathematical methods

We gratefully acknowledge the *Centre National de la Recherche Scientifique*, the *Region Bourgogne* and the *Université de Bourgogne*, which contributed to the opportunity of gathering in Dijon leading scientists in both experimental and theoretical nonlinear science by providing the workshop with financial support .

We are grateful to Mrs A.Levy, D.Arnoux and Y.Boiteux for their active collaboration in the meeting, and to all our colleagues who helped us in many ways.

Dijon , June 1991

M. REMOISSENET

M. PEYRARD

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