

## PREFACE

These Conference Proceedings contain the contributions and lecture courses presented at the XIV<sup>th</sup> International Conference on Geometry, Integrability and Quantization which took place in the gorgeous geographical frame of the Saints Constantine and Elena resort, on the Black Sea coast, during June 8-13, 2012.

Already a long tradition, and a milestone among all international fundamental, theoretical and mathematical physics conferences around the world the event was organized again in one continuous session, and no parallel ones. In this way the conference provided a good setting for vivid discussions and interactions between participants and lecturers. The topics, clearly delimited, and copiously fulfilled by interesting and professional talks, yet left enough room for diversity and collateral contributions. Some of the original slides of the talks can be found at the internet site of the conference.

The organizing committee (pretty international one) succeeded to invite 34 talks, including the two plenary ones with participants from Bulgaria, Czech Republic, France, Italy, Japan, Poland, Portugal, Romania, Russia, South Africa, Turkey, and USA. One quarter of the talks were dedicated to nonlinear systems and integrability. Among the topics we mention talks on the derivative NLS, harmonic analysis on Lagrangian manifolds of integrable Hamiltonian systems, three-wave resonant interaction equations, localized finite energy solutions and solitons in dissipative media. Within the interesting open problem on methods approaching integrable systems we mention talks on recursion operator the CBC system, integro-differential Lax representations, etc.

The rest of three quarters of talks had topics equally divided in five other areas (each holding 16% of the number of talks), each area covered by about five talks. Next well represented area was related to algebra, algebraic geometry, groups and symmetries. There were talks devoted to the exponential maps on  $SO(n)$  and  $SE(n)$ , groupoids and inverse semigroups associated to W-algebras, star products, moving frames and Lie groups in general. Among examples from physics we enumerate a model for the membrane shape, and for mixing of fluids.

The other six of the talks were populated by the uncertainty principle in general relativity, pseudo-Riemannian metrics, spinoptics in gravitational field, fields of linear frames and gauge gravitation, and the MIC-Kepler problem. Another sixth part of talks were devoted to geometry. Here we mention presentations on multiparameter contact transformations, the Lawson correspondence for minimal surfaces, f-biharmonic maps, algebraic topology of spherical isoparametric hypersurfaces, and PMC submanifolds in product spaces.

In completion to these talks, another sixth part of the conference was dedicated to field theory and strings problems. Namely an discreteness, nonlocality and causality in noncommutative field theory, fermionic screening currents, line bundle twisted chiral de Rham complexes on toric manifolds, Seiberg-Witten prepotentials for Hitchin's systems, The non-uniqueness of the conservative versus radical solutions, and of course Yang-Mills fields. Finally, the last 15% of the talk were spread within different fields of mathematical physics, including condensed matter, like waves propagation in transmission bands of periodic media, single-wall CNT under pressure, fluid membranes and studies on Rational Ruijsenaars-Schneider-van Diejen models.

We would like to address special thanks to all participants at the conference for contributing their time and effort to its completion, and for sharing the originality of their work with all of us, on the screen and in the proceedings. Gracious thanks to Mrs. Mariana Hadzhilazova for her creative organizing tips and ideas, for her assistance and overall help during Conference and the preparation of these Proceedings.

We would like to extend our thanks to the Bulgarian participants for their generous support, warm hospitality which made possible such a successful melting pot of mathematics, physical science and cultures. The organizers would like to thanks them for making everything in their powers to allow the foreign participants to feel like home.

We hope that every one will meet again at the XV<sup>th</sup> International Conference on Geometry, Integrability and Quantization that will be held on June 7-12, 2013 at the same exquisite location. We also hope that it will attract even more participants and it will be of the same high quality and fun as all its other fourteen predecessors.

*The Editors*