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Vladimir Dobrev *Editor*

Lie Theory and Its Applications in Physics

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Vladimir Dobrev
Editor

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Preface

The Workshop series "Lie Theory and Its Applications in Physics" is designed to serve the community of theoretical physicists, mathematical physicists, and mathematicians working on mathematical models for physical systems based on geometrical methods and in the field of Lie theory.

The series reflects the trend toward a geometrization of the mathematical description of physical systems and objects. A geometric approach to a system yields in general some notion of symmetry which is very helpful in understanding its structure. Geometrization and symmetries are meant in their widest sense, i.e., representation theory, algebraic geometry, number theory infinite-dimensional Lie algebras and groups, superalgebras and supergroups, groups and quantum groups, noncommutative geometry, symmetries of linear and nonlinear PDE, special functions, and functional analysis. This is a big interdisciplinary and interrelated field.

The first three workshops were organized in Clausthal (1995, 1997, 1999), the 4th was part of the 2nd Symposium "Quantum Theory and Symmetries" in Cracow (2001), the 5th, 7th, 8th, 9th, 11th, and 13th were organized in Varna (2003, 2007, 2009, 2011, 2013, 2015, 2019), the 6th and the 12th were part of the 4th, resp., 10th, Symposium "Quantum Theory and Symmetries" in Varna (2005, 2017).

The 14-th Workshop of the series (LT-14) was organized by the Organizing Committee from the Institute of Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences (BAS) in June 2021 (21–25). Due to the COVID-19 restrictions it was organized online, based in Sofia.

The overall number of participants was 97 and they came from 25 countries. The number of talks was 87.

The scientific level was very high as can be judged by the *plenary speakers*: Toshiyuki Kobayashi (Tokyo), Yang-Hui He (london & Tianjin), Ivan Todorov (Sofia), Patrizia Vitale (Napoli), Paolo Aschieri (Alessandria & Torino), Nikolay Bobev (Leuven), Tomasz Brzezinski (Swansea & Bialystok), Malte Henkel (Nancy & Lisboa), Volodymyr Mazorchuk (Uppsala), and George Zoupanos (Athens & CERN).

The topics covered the most modern trends in the field of the Workshop: Symmetries in String Theories, (Super-)Gravity Theories, Conformal Field Theory, Integrable Systems, Representation Theory, Quantum Computing and Deep Learning, Applications to Quantum Theory. Gauge Theories and Applications, Structures on Lie Groups and Lie Algebras.

The International Steering Committee was: C. Burdik (Prague) V. K. Dobrev (Sofia, Chair), H. D. Doebner (Clausthal), B. Dragovich (Belgrade), and G. S. Pogosyan (Yerevan & Guadalajara & Dubna).

The Organizing Committee was: V. K. Dobrev (Chair), L. K. Anguelova, V. I. Doseva, V. G. Filev, A. Ch. Ganchev, D. T. Nedanovski, S. J. Pacheva, T. V. Popov, D. R. Staicova, N. I. Stoilova, and S. T. Stoimenov.

Sofia, Bulgaria Vladimir Dobrev
May 2022

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