

# 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 towards a geometrisation 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. Geometrisation 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, 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, 7–10th were organized in Varna (2003, 2007, 2009, 2011, 2013), the 6th was part of the 4th Symposium ‘Quantum Theory and Symmetries’ in Varna (2005), but has its own volume of proceedings.

The 11th Workshop of the series (LT-11) was organized by the Institute of Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences (BAS) in June 2015 (15–21), at the Guest House of BAS near Varna on the Bulgarian Black Sea Coast.

The overall number of participants was 76 and they came from 21 countries.

The scientific level was very high as can be judged by the speakers. The *plenary speakers* were: Luigi Accardi (Rome), Lorian Bonora (Trieste), Branko Dragovich (Belgrade), Malte Henkel (Nancy), Stefan Hollands (Leipzig), Evgeny Ivanov (Dubna), Toshiyuki Kobayashi (Tokyo), Zohar Komargodski (Weizmann), Ivan Penkov (Bremen), Birgit Speh (Cornell U.), Ivan Todorov (Sofia), Joris Van Der Jeugt (Ghent), Joseph A. Wolf (Berkeley), Milen Yakimov (Louisiana SU), George Zoupanos (Athens).

The topics covered the most modern trends in the field of the workshop: Symmetries in String Theories and Gravity Theories, Conformal Field Theory,

Integrable Systems, Representation Theory, Supersymmetry, Quantum Groups, Vertex Algebras, Application of Symmetry to Probability, Dynamical Symmetries.

There is some similarity with the topics of preceding workshops, however, the comparison shows how certain topics evolve and that new structures were found and used. For the present workshop we mention more emphasis on: representation theory, on conformal field theories, integrable systems, vertex algebras, number theory, higher-dimensional unified theories.

The International Organizing Committee was: Vladimir Dobrev (Sofia) and H.-D. Doebner (Clausthal) in collaboration with G. Rudolph (Leipzig).

The Local Organizing Committee was: Vladimir Dobrev (Chairman), L.K. Anguelova, V.I. Doseva, A.Ch. Ganchev, D.T. Nedanovski, T.V. Popov, D.R. Staicova, M.N. Stoilov, N.I. Stoilova, S.T. Stoimenov.

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