

The 22th Student Conference  
“Winter School on **MATHEMATICAL PHYSICS**”

The Department of Physics and the Doppler Institute of the Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague together with the Department of Mathematics and Informatics, University of Białystok have organized the international Winter School for undergraduate and graduate students in the village Janské Lázně (Krkonose mountains), January 20 – 26, 2013.

The aim of the School was the same as in recent years: to give the students a unique opportunity to present the results of their research work in English and so contributed to the improvement of their communication skills in a very informal international setting. There were 48 participants coming from the University of Białystok (Poland) (9), University of Hradec Kralove (1), Comenius University in Bratislava (5) and Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague (32), Charles university in Prague (1).

The varied topics dealt with in the Winter School were related to several fields of contemporary mathematical physics (see the program below).

Up to five daily lectures of the Winter School were held in the morning (9.00 – 13:00 a.m.) and late afternoons were devoted to discussions. The setting of the Krkonose mountains covered with snow enriched the overall informal atmosphere of this fruitful meeting.

Prague, February 1, 2013

Goce Chadzitaskos and Libor Šnobl,  
(on behalf of the Organizing Committee)

## Conference program

### Monday, January 21

#### morning session

- 9:00 – 9:25 Václav Potoček: *Composing lenses*
- 9:30 – 9:55 Iva Bezděková: *General localizing coin for the 3-state quantum walk*
- 10:00 – 10:25 Antonín Hoskovec: *Classical computational operations and their quantum counterparts*
- 10:35 – 11:00 Helena Šediváková: *Introduction to  $SU(5)$  grand unified theory*
- 11:05 – 11:30 Šimon Valko: *Unitary  $K$ -designs*
- 11:40 – 12:05 Jan Korbel: *Can be quantum mechanics formulated as stochastic process?*
- 12:10 – 12:35 Filip Petrášek: *BCH formula and transformation of group coordinates for 6-dimensional Drinfeld doubles*

### Tuesday, January 22

#### morning session, chairman: L. Šnobl

- 9:00 – 9:50 Marián Fecko: *Killing tensors*
- 10:00 – 10:25 Jan Mareš: *Quantum walks on percolated graphs*
- 10:30 – 10:55 Hana Zemanová: *Formation of lightnings and runaway breakdown*
- 11:00 – 11:25 Adam Brus: *Coboundary Poisson-Lie groups*
- 11:35 – 12:00 Dominik Šafránek: *Continuous many-world interpretation*
- 12:05 – 12:30 Michal Jex: *Photogeneration of charge carriers in 1D polymer materials*

#### afternoon session, chairman: L. Šnobl

- 14:30 – 14:55 Daniel Vašata: *Generalized center of mass*
- 15:00 – 15:25 R. Jankowski: *One-third law*
- 15:30 – 15:55 Joanna Zonenberg: *The potential symmetry for partial differential equations*

- 16:00 – 16:25 Pavel Heller: *Nonstandard numeration systems*
- 16:30 – 16:55 Tomáš Bzdušek: *Analytic continuation of imaginary frequency data to the real axis*

### Wednesday, January 23

**afternoon session,** chairman: P. Novotný

- 14:00 – 14:25 Barbora Planková: *Homogeneous droplet nucleation*
- 14:30 – 14:55 Jan Vysoký: *Rudiments of graded geometry*
- 15:05 – 15:30 S. Grabowiecka: *Universal  $C^*$ -algebras*
- 15:35 – 16:00 T. Zynda: *Discrete logarithm and elliptic curves in cryptography*
- 16:10 – 16:35 Václav Zatloukal: *Local time of path integral*
- 16:40 – 17:05 Josef Schmidt: *Conserved quantities for cosmological perturbation*
- 17:15 – 17:40 B. Krzemieli: *The Cantor–Bernstein theorem*
- 17:45 – 18:10 Ivo Petr: *Constrained quantization with or without tears*

### Thursday, January 24

Excursions, skiing

### Friday, January 25

**morning session,** chairman: J. Hrivnák

- 9:00 – 9:25 Radek Novák: *Bound states in non-Hermitean quantum waveguides*
- 9:30 – 9:55 Jiří Maryška: *Asymptotic evolution of random unitary operations*
- 10:05 – 10:30 Dalibor Karásek: *Rudiments of cohomology of Lie algebras*
- 10:35 – 11:00 Lenka Háková: *Reflection-generated polytopes*
- 11:15 – 11:40 Matej Škovran: *Possible effect of shear stress on cosmological perturbations*
- 11:45 – 12:10 Gabriela Malenová: *On spectral gap of quantum graphs*