IV School on Geometry and Physics  
6 July — 11 July 2015  
LIST OF COURSES

1. Maciej DUNAJSKI — University of Cambridge, United Kingdom  
   An introduction to twistor theory

2. Bogdan MIELNIK — CINVESTAV, Mexico  
   The non-inertial quanta: reality or fiction?  
   Intense discussions in QM and QFT about the possibility of the “quantization” by  
   the observers using the non-inertial reference frames seems of great interest for  
   the coexistence of the relativistic and quantum theories. However, the methods  
   used to solve the problem are based on ideas which did not answer all critical  
   questions. We shall show an example of an explicitly solvable quantum system  
   in both inertial and non-inertial reference frames. The comparison of the results  
   throws some shadow on the quantum formalism applied from the point of view  
   of non-inertial frames.

3. Yurii NERETIN — Institute for Theoretical and Experimental Physics, Russia  
   Hilbert spaces of holomorphic functions

4. Stanislav STEPIN — Uniwersytet w Białymstoku, Poland  
   Phase integrals method in the problem of quasiclassical localization of spec-
   trum  
   An approach based on phase integrals method will be outlined that enables one  
   to examine quasiclassical asymptotics of spectrum for nonselfadjoint singularly  
   perturbed operators. This approach is applied then to boundary eigenvalue prob-
   lem for second order differential operators with PT-symmetric cubic potentials  
   of generic type. Bohr-Sommerfeld quantization rules are derived to describe the  
   location of the spectrum and geometric properties of the corresponding spectrum  
   concentration curves are investigated as well.

5. Theodore VORONOV — University of Manchester, United Kingdom  
   Selected topics in vector bundles, supermanifolds and Lie algebroids  
   I wish to give an elementary introduction into these three concepts basing on  
   examples and not assuming any prior knowledge. Vector bundles arise every-
   where in geometry. Supermanifold language is a powerful tool in geometry and  
   mathematical physics. Supermanifolds are related with vector bundles via the  
   classification theorem. Lie algebroids naturally generalize Lie algebras. They are  
   useful in connection theory (for vector bundles) and are best described using the  
   super language.

6. Stanisław Lech WORONOWICZ — Uniwersytet w Białymstoku, Poland  
   Operator algebras in the quantum groups context  
   We shall recall the basic concepts of the category of C*-algebras from the point  
   of view of their applications in the theory of locally compact quantum groups.