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 explicitely solvable quantum system in both inertial and non-inertisl 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 spectrum
   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 problem 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 everywhere 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 contex
   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.