

**Institute of Mathematics and Center of Theoretical Physics (PAS)
together with the Chair of Mathematical Methods in Physics (UW)**

**invite in the academic year 2017/18 students, PhD students,
and researchers of each age
to the seminar**

GEOMETRICAL METHODS IN PHYSICS

Fundamental geometric ideas come from physics. Differential geometry is the area in which physics intuitions take their form and where a precise language is constructed, in which problems of physics can be discussed. Is the language used today fitting to the realm of contemporary physics?

Our seminar is thought of firstly, as a place for discussions on foundations and relationships between algebra, geometry and physics, and secondly as a place for presentation of recent developments and achievements in these areas. We agree with Arnold's opinion that;

MATHEMATICS IS THE PART OF PHYSICS WHERE EXPERIMENTS ARE CHEAP

Main topics include:

- 1) Differential geometry and formalisms of mechanics and field theory**
 - Formalisms of Lagrange and Hamilton with constraints and generalizations
 - Geometry of higher order theories
 - Supergeometry and graded differential geometry
- 2) Geometry of jet bundles and PDEs**
 - Cartan distributions, prolongations, and symmetries
 - Homological methods for PDEs and classical field theories
- 3) Geometry and dynamics of quantum systems**
 - Geometry of quantum states, entanglement, and teleportation
 - Quantum fields
- 4) Geometric control theory and control of quantum systems**
 - Vector distributions
 - Optimal control in optics, chemistry, and technique.

This seminar could be a source of good ideas and topics for master and PhD theses. It offers also many possibilities for an international cooperation (scientific trips and visits, internships, etc.).

The seminar takes place in the **Institute of Mathematics (PAS), Śniadeckich Street 8, room 106, on Wednesdays, 2.15 pm - 4.00 pm.**

YOU ARE CORDIALLY INVITED.

WE START ON WEDNESDAY, OCT. 4, 2017.

**Janusz Grabowski and Bronisław Jakubczyk (IMPAN), Katarzyna Grabowska,
Jacek Jezierski (KMMF UW), and Marek Kuś (CFT)**

Information about the seminar can also be found on the web pages
<http://www.fuw.edu.pl/KMMF/sem.wto.html>,
<http://www.cft.edu.pl/seminar/seminariumG.php> and
<http://www.impan.gov.pl/Biuletyn/>