ESI Erwin Schrödinger International Institute for Mathematics and Physics

universität wien

DVR 0065528

ESI SENIOR RESEARCH FELLOW LECTURE COURSE

Winter Term 2017/18

The Erwin Schrödinger International Institute for Mathematics and Physics (ESI) of the University of Vienna offers the following Lecture Course held by a Senior Research Fellow in residence during the Winter Term 2017/18:

Applied Newton-Cartan Geometry
Eric Bergshoeff (University of Groningen)

Lecture Course (260053 VO): January 10 to 29, 2018
Time: 9:15 - 10:45 a.m.
Start: Wednesday, January 10, 2018
Further Dates: Friday, January 12, 2018, Friday January 19, 2018,
Wednesday, January 24, 2018, Friday, January 26, 2018
End: Monday, January 29, 2018

Venue: ESI, Schrödinger Lecture Hall

Abstract: In the first part of the course I give an extensive introduction into the frame-independent formulation of Newtonian Gravity developed by Elie Cartan, the so-called Newton-Cartan Gravity. Examples from General relativity are used to explain the construction of this Newton-Cartan formulation.

In the second part of the course I will discuss three more specialistic topics: (i) Non-relativistic limits, (ii) Non-relativistic supersymmetry and (iii) Applications to a concrete model: the Quantum Hall Effect.

Content of the course:
Lecture 1: an overview of those aspects of General Relativity that are relevant for the remaining part of the course
Lecture 2: The kinematics of General Relativity will be derived by applying the gauging technique to the Poincare algebra
Lecture 3: The gauging technique will be applied to construct the kinematics of Newton-Cartan Gravity
Lecture 4: Different non-relativistic limits are discussed that relate relativistic gravity or matter theories to non-relativistic ones.
Lecture 5: An introduction to non-relativistic supersymmetry will be given with an emphasis on supersymmetry in a curved background in view of applications of the so-called Supersymmetric Localization technique.
Lecture 6: The Newton-Cartan formalism will be applied to the concrete example of the The Quantum Hall Effect

Aims for the course:
1) Understanding the Newton-Cartan Formalism
2) understanding relating relativistic gravity and matter theories to non-relativistic ones by taking limits
3) being able to work with non-relativistic supersymmetry
4) being able to apply the Newton-Cartan formalism to a concrete example: the Quantum Hall Effect

Course website: http://www.esi.ac.at/activities/events/2018/srf-course-eric-bergshoeff-ws2017-18

Christoph Dellago
Director