



LUDWIG-  
MAXIMILIANS-  
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MÜNCHEN

MATHEMATISCHES INSTITUT  
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VORLESUNGSANKÜNDIGUNG



SoSe16

Blockveranstaltung (30 May – 10 June 2016):

# *Geometry and bound states of magnetic Schrödinger operators.*

**Lecturer:** Nicolas Raymond (IRMAR, University of Rennes 1).

**Time and place:** *30 May – 03 June & 06 – 10 June 18:15-20:00 in A 027.*

**First meeting:** *Monday 30 May 2016, 18:15 in A 027.*

**Synopsis:** This course will address the spectral theory of magnetic Schrödinger operators, in the semiclassical limit. We will introduce the methods and ideas related to the accurate description of the low-lying spectrum. We will first recall the basics of spectral theory and deal with many examples. In particular, we will explain what the quantum harmonic approximation (for electric potentials) is and justify it, with the idea to extend it to the magnetic situation. For that purpose, we will discuss the methods related to partitions of unity and to localization properties of eigenfunctions (with applications to some non-linear situations). In this course, we will also meet the strategy of dimensional reduction called "Born-Oppenheimer approximation" and apply it, for instance, to the eigenvalue-counting problem. If time permits, we will also talk about the famous Birkhoff normal form and about complex WKB constructions (with examples). For a detailed overview of topics, see <http://www.math.lmu.de/~sorensen>

**Audience:** Master students of Mathematics and Physics, TMP-Master.

**Prerequisites:** A basic knowledge of Mathematical Quantum Mechanics (corresponding to the course 'Mathematical Quantum Mechanics 1' (MQM1)) is an advantage.

**Language:** The lecture will be in English.

**Literature:** The lectures will be based on

[R] N. Raymond, *Bound States of the Magnetic Schrödinger Operator*, EMS Tracts in Mathematics (2016, forthcoming).

**Further information:** <http://www.math.lmu.de/~sorensen>

Prof. Thomas Østergaard Sørensen, Ph.D.