Course title:

Introduction to Quantum Mechanics

Duration [number of hours]: 24

PhD Program [MERC/MPS/SPACE]: _____

Name and Contact Details of Lecturer:

Prof. Gennaro Miele gennaro.miele@unina.it

Course Description [max 150 words]:

At the end of 19-th century, scientists found phenomena that could not be explained in terms of Mechanics ed Electromagnetism laws. These were phenomena mainly restricted to the microscopic world or strictly related to it. It was the beginning of a big revolution in Physics that led to the born of Quantum Mechanics (QM) and Theory of Relativity. The course is a brief and general introduction to Quantum Mechanics. It aims to provides the main concepts of this very counterintuitive theory as well as the mathematical tools necessary to tackle quantitatively the subject. In particular the Schrödinger equation will be introduced a studied for some particular quantum systems. The axiomatic structure of QM will be outlined and discussed.

Syllabus [itemized list of course topics]:

- Experimental foundations of quantum theory
- Schrödinger picture and probabilistic
- Integrating the equations of motion
- Elementary applications of Schrödinger: Square-well potentials and the Harmonic Oscillator
- The Hydrogen Atom
- The Axiomatic of Quantum Mechanics
- Introduction to spin
- Symmetries in Quantum Mechanics

Assessment [form of assessment, e.g. final written/oral exam, solutions of problems during the course, final project to be handed-in etc]:

Final written + oral exam

Suggested reading and online resources:

1. Advanced Concepts in Quantum Mechanics, by G. Esposito, G. Marmo, G. Miele, G. Sudarshan, Cambridge University Press.
2. Quantum Theory, by D. Bohm, Dover Publications, Inc., New York.
3. Modern Quantum Mechanics, by J.J. Sakurai and Jim Napolitano, Cambridge University Press.