


Module: **Elective Advanced Lectures:
Theoretical Physics**

Module No.: physics70c

Course:  **Time Evolution of Quantum
Systems (T)**

Course No.: physics7518

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	2+2	5	WT/ST

Requirements for Participation:

Preparation:

Theoretical courses at the Bachelor degree level, solid knowledge of a programming language

Form of Testing and Examination:

Presentation of an independently completed project

Length of Course:

1 semester

Aims of the Course:

Getting familiar with common problems arising in the time evolution of quantum systems and approaches to solve them

Contents of the Course:

A selection of:

- Real time evolution
- Imaginary time evolution
- Analytic continuation
- Approximation methods
- Numerical solution of stiff equations of motion
- Floquet theory
- Open quantum systems
- Non-equilibrium dynamics

Recommended Literature:

- W. H. Press, S. A. Teukolsky, W. T. Vetterling, B. P. Flannery, "Numerical Recipes: The Art of Scientific Computing", Cambridge University Press.
- E. Hairer, G. Wanner, "Solving Ordinary Differential Equations II: Stiff and Differential-Algebraic Problems", Springer.
- Research and review articles tba in the lecture.