Paris Physics Master 2023-2024

Advanced Quantum Mechanics

1 Prerequisites:

Introductory course in Quantum Mechanics covering approximately the material in the first three chapters of "Introduction to Quantum Mechanics", D. Griffiths, 2nd edition (Pearson).

2 Course plan (12 x 2h30 lectures)

Most of the course will be based closely on *"Modern Quantum Mechanics", J.J.Sakurai and J.Napolitano, 2nd edition (Pearson)* and in some parts also on *"Quantum Physics", M. Le Bellac, (Cambridge)*

Chapter 1: Fundamental concepts in quantum mechanics (3 lectures) [SN Chapter 1, SN Chapter 2.1-2.5, Le Bellac Chapter 6 (up to section 3.2) for entanglement]

Chapter 2: Angular momentum in quantum mechanics (2 lectures) SN Chapter 3, sections 3.1-3.3, 3.5,3.6,3.8]

Chapter 3: Central potentials and the Hydrogen atom (1 lecture) [SN Chapter 3, section 3.7]

Chapter 4: Symmetry in quantum mechanics (2 lectures) [SN Chapter 4, Le Bellac Chapter 8]

Chapter 5: Approximation methods (2 lectures)[SN Chapter 5, sections 5.1-5.7]

Chapter 6: Identical particles (1 lecture)[SN Chapter 7, sections 7.1-7.4]

Chapter 7: Other topics (1 lecture) [TBA]

3 Contacts

- Michael Joyce (lectures), LPNHE, Jussieu, Office 12-22-232, joyce@lpnhe.in2p3.fr
- Edouard Boulat (tutorials), MPQ, Tolbiac edouard.boulat@univ-paris-diderot.fr

4 Other useful textbooks

- Introduction to Quantum Mechanics, D. Griffiths, 2nd edition (Pearson)
- Principles of Quantum Mechanics, R. Shankar, 2nd edition (Yale)
- Quantum Mechanics, L. Schiff, 3rd edition (McGraw Hill)

5 Evaluation

Midterm, early November 2023 (written exam, 2h30)

Final, early January 2024, (written exam, 3h)

Final Grade=sup($\frac{1}{2}$(midterm+final), final)