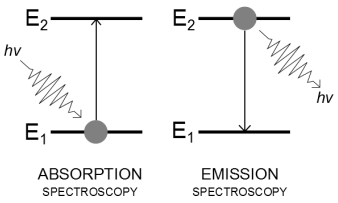
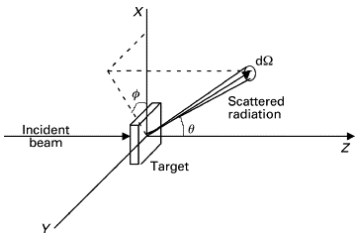
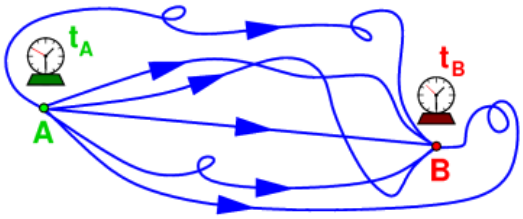
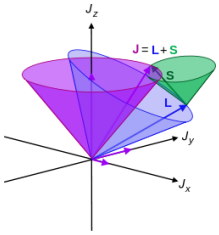
Kaiserslautern, October 23, 2022

Quantum Mechanics II









Content

- Time-independent perturbation theory: Brillouin-Wigner method
- Time-dependent perturbation theory: absorption and emission of radiation
- Scattering theory: scattering amplitude and cross-section, Rutherford scattering
- Path integral description of quantum mechanics: free particle, harmonic oscillator
- Addition of angular momenta: Clebsch-Gordan coefficients, Landé factors
- Relativistic wave equations: Klein-Gordon and Dirac equation

References

- D. I. Blokhintsev, *Quantum Mechanics*, Springer, 2013
- R. P. Feynman and A. R. Hibbs, Quantum Mechanics and Path Integrals, McGraw Hill, 1965
- H. Kleinert, Path Integrals in Quantum Mechanics, Statistics, Polymer Physics, and Financial Markets, 5th Edition, World Scientific, 2009
- D. H. McIntyre, Quantum Mechanics - A Paradigms Approach, Pearson, 2012
- G. Münster, Quantentheorie, Walter de Gruyter, 2006
- J.J. Sakurai and J. Napolitano, Modern Quantum Mechanics, Third Edition, Cambridge University Press, 2021
- R. Shankar, Principles of Quantum Mechanics, Second Edition, Kluwer Academic, 1994
- F. Schwabl, *Quantenmechanik (QMI)*, 7. Auflage, Springer, 2007
- F. Schwabl, Quantenmechanik für Fortgeschrittene (QMII), 5. Auflage, 2008

Organizational Remarks

- **Lectures:**
  - 4 hours per week
  - 8 ECTS credits
  - Certificate for active participation:
    - Seminar talk of 15 minutes at semester end
    - Suggestions for topics announced before Christmas
- **Exercises:**
  - 2 hours per week
  - 4 ECTS credits
  - Certificate for active participation:
    - 50 % from all points of all exercise sheets
    - Five times calculations at the black board
  - Two students can submit one group solution of a problem set for evaluation.
  - Drop the solutions in the post box on the 5th floor of building 46 or, in case of illness/quarantine, send them via email to `jkrauss@rhrk.uni-kl.de`
- **Oral module exam possible**