

Applications of Group Theory  
to the Condensed Matter Physics  
(52309)

**A) Index of the arguments treated in the course:**

1. The elementary properties of groups
2. Representation theory and basic theorems
3. Character of a representation
4. Basis functions
5. Electronic states of molecules
6. Crystal field theory
7. Spin-orbit and double groups
8. Molecular vibrations, infrared and Raman activity
9. Transition between electronic states
10. Continuous groups
11. Time-reversal symmetry
12. Permutation groups and many-electron states

**B) Literature. The texts which I will mostly use during the course are:**

1. "Group Theory: Application to the Physics of Condensed Matter" by M. S. Dresselhaus, G. Dresselhaus, A. Jorio, Springer Verlag Berlin Heidelberg (2008).
2. "Group Theory with Applications in Chemical Physics" by P. Jacobs, Cambridge University Press (2005).

**C) Technical information:**

1. Lectures will take place on Mondays 14:00 c.t. – 16:00 in the room PHY 9.2.01.
2. Exercises will take place on Fridays 10:00 c.t. – 12:00 in the room PHY 7.1.21.
3. For questions I will reserve Wednesdays 9:00 – 10:00 in my office PHY 3.1.24.