

BASICS OF GROUP THEORY AND APPLICATIONS IN SOLID STATE PHYSICS AND PHOTONICS

tutorial

Feb. 12/19/26, 2020 | 4:00 pm

Lecture Hall MPI | B.1.11

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Abstract

Symmetry and symmetry breaking are basic concepts in physics. The mathematical language to describe those concepts is group theory. The application of group theory in physics has a long tradition, ranging back to the beginning of the twentieth century. The material, necessary to tackle a special problem by means of group theory, is often scattered in books or available in different online resources. Printed tables are not very useful. Thus, a computer based tool would be helpful. The intention of this series of three lectures is twofold. The introduction to the concepts of group theory will be accompanied by the discussion of examples using the Mathematica based package GTPack [1], designed to perform group theoretical considerations in solid state theory and photonics. The lectures will be organized as follows:

1st lecture : Basic concepts of group theory

2nd lecture : Representation theory

3rd lecture : Examples from electronic structure theory and photonics

[1] W. Hergert, M.R. Geilhufe, Group Theory in Solid State Physics and Photonics: Problem Solving with Mathematica, Wiley-VCH, 2018

Speaker

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