34th International Colloquium on Group Theoretical Methods in Physics

Lectures of Group Theory

Abstract

The International Colloquium on Group Theoretical Methods in Physics is a traditional conference series which covers a wide variety of important topics related to symmetry relevant in mathematics and physics. The Colloquium is a meeting point for scientists who work at modelling physical phenomena through mathematical and numerical methods based on geometry and symmetry.

The 34th International Colloquium on Group Theoretical Methods in Physics (or Group 34) will be a milestone for this mathematical and theoretical physics conference, as it will be the celebration of its 50th anniversary. We thus organise special events dedicated to this anniversary:

1. A lecture for the general public given in French on the evolution of group theory and its signification in physical application will be given by Jean-Marc Lévy-Leblond (Univ. Côte d'Azur);
2. Three mini-courses of four hours each for graduate students. The purpose of these series of lectures is to describe from an elementary point the use of group theory in the description of symmetries.
   (a) introduction to group-theoretical methods (by Pierre Baumann, Strasbourg Univ.);
      i. Examples of groups and of group actions.
      ii. Representations of groups. Harmonic analysis.
      iii. Correspondence Lie groups - Lie algebras.
      iv. Classification of compact Lie algebras and their representations.
   (b) group theory in particle physics (by Guillaume Bossard, École Polytechnique);
      i. The need for an organization principle in particle physics.
      ii. The rotation group in quantum physics, addition of spins.
      iii. The group SU(3) and its representations from Young diagrams.
      iv. The Gell-Mann model of quarks.
   (c) group theory in condensed matter physics (by Rodolfo Jalabert, Strasbourg Univ.).
      i. Two and three-dimensional lattices. Reciprocal lattices and Brillouin zones.
      ii. Crystal-symmetry operations.
      iii. Space group. Translation and point groups.
      iv. Irreducible representations of point groups.
      v. Macroscopic implications of microscopic symmetries.
      vi. Electrons in solids. Bloch theorem.
      vii. Crystal symmetry and the group of the k-vector.
      viii. Double groups. Spin-orbit coupling.

More information can be found on the web site https://indico.in2p3.fr/event/23498/overview.

The mini-course will take place at

Institut de physique, 3-5 rue de l'université, 67000 Strasbourg,
18, 19, 21, 22 July 2022 14:00-17:25

18 July 14:00-14:55 P. Baumann
18 July 15:00-14:55 P. Baumann
18 July 16:00-16:25 Coffee-Break
18 July 16:30-17:25 R. Jalabert

19 July 14:00-14:55 P. Baumann
19 July 15:00-14:55 P. Baumann
19 July 16:00-16:25 Coffee-Break
19 July 16:35-17:25 G. Bossard

20 July 14:00-14:55 R. Jalabert
20 July 15:00-14:55 R. Jalabert
20 July 16:00-16:25 Coffee-Break
~~20 July 16:35-17:25 G. Bossard~~
21 July 9:00-9:55 G. Bossard

22 July 14:00-14:55 G. Bossard
22 July 15:00-14:55 G. Bossard
22 July 16:00-16:25 Coffee-Break
22 July 16:30-17:25 R. Jalabert