UNIVERSITAT JAUME I

Institut Universitari de Matemàtiques i Aplicacions de Castelló · IMAC

Thematic Semester on

QUANTUM MATHEMATICS

The Ma thematics inspired by Quantum Mechanics

Irreducible Representations and Particle Physics

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Abstract: The realisation of the importance of symmetry principles in physics was crucial for the scientific revolution that turned the 20th century into the "century of physics". Group theory, the mathematical tool to describe symmetries, has since then become a standard tool in theoretical physics. Irreducible representations of Lie groups, in particular, are commonplace in the modern description of particle physics.

After a very brief historical introduction I will present a bird's-eye view on the most important uses of irreducible representations of groups in particle physics:

I) Irreducible representations and particle classification. Groups, symmetries, conserved quantities, symmetry breaking.

II) Irreducible representations and quantum field theory. What types of quantum fields can exist? What type of particle do they describe?

III) Groups and gauge theories. Or how groups and their irreducible representations are used to build theories and make predictions to be tested experimentally.

Fecha: 13 de mayo de 2019
Hora: 11:00 horas.
***Lugar: Seminario TI2328SD,* ESTCE.**
Universitat Jaume I de Castelló