OIST OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY
沖縄科学技術大学院大学

THEORETICAL SCIENCES VISITING PROGRAM

TSVP TALK

Quantum Groups and Quantum (Relativistic) Symmetries

2025 TUE. Jan. 28

14:00–15:00

HYBRID L5D23, ZOOM

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Quantum groups are remarkable algebraic objects, and their axioms are so elegant that they appeared already in 1940s. However, the first convincing examples (with additional structure) were introduced independently by different authors in the 80s in the context of quantum integrable systems, and slightly later in the search for models of quantum gravity. At the same time the idea of noncommutative geometry (NCG) was being developed. These modern examples and their links to NCG made the quantum groups the subject of investigations in pure mathematics as well as in theoretical physics, a research field which is very active nowadays. In my talk I will start with ideas of groups and symmetries appearing in physics and based on simple examples, introduce the concept of quantum groups. I will present how quantum groups can be also considered as a generalized description of relativistic symmetries that arise when space-time becomes quantized. With such interpretation quantum groups and NCG provide useful framework and mathematical language in an approach to model quantum gravitational effects in an effective description without knowledge of the full theory itself.

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Anna Pachol

Anna Pachol is an associate professor at the University of South-Eastern Norway. Her research focuses on an intersection of topics from theoretical and mathematical physics such as quantum groups (Hopf algebras) and noncommutative geometry, quantum Riemannian geometry, deformation theory, in applications to quantization of space-time and deformations of relativistic symmetries. Currently she works on investigating the consequences of noncommutativity (quantization) in both space-time and momenta sectors, and Planck scale effects in quantum mechanical systems. She obtained her PhD in 2011 at the University of Wroclaw, then held postdoctoral position at University of Iceland and subsequently as Marie Curie Fellow at both University of Turin and at Queen Mary University of London. Before moving to Norway, she was a senior lecturer at Queen Mary University of London.

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