PhD research topic proposal
BME, Doctoral School of Mathematics and Computer Science

Name of supervisor :

Péter Vrana

Degree:

PhD

Title of the topic:

Algebraic methods in entanglement theory

Short description:

Quantum information theory aims to utilize phenomena described by quantum theory for tasks involving information processing and communication. One of its central concepts is quantum entanglement, many aspects of which remain poorly understood. The aim of the PhD research is to develop tools for studying operationally motivated properties of entangled states, in particular for deciding equivalence and computing or estimating asymptotic transformation rates.

Specific topics include (with substantial overlap between them): finding invariants and understanding their properties via representation theory, studying the resource theory of entanglement transformations via monotones, constructing and analysing protocols implementing such transformations, and adapting the methods to other resource theories.

Requirements:

MSc in mathematics, physics or a related field, solid background in mathematics, especially in linear and abstract algebra, interest in the mathematical aspects of phyisics. Prior knowledge in classical or quantum information theory is an advantage but not required.

Contact:

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Place of work:

Institute of Mathematics, Budapest University of Technology and Economics

Statement: *The conditions of the research above are satisfied, the theme is confirmed by the Head of the Department/Institute*