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Project: Quantum correlations – from few to many particles
BEETHOVEN 2 – Polish - German Funding Initiative

Description for the general public

Quantum entanglement is at the core of the new features of quantum physics. Its direct manifestation in our world are correlations between measurement results much stronger than what is possible within classical physics. These correlations allow to explore the foundations of quantum mechanics and at the same time can be harnessed for revolutionary applications in information processing.

Significant results have been achieved for understanding and applying correlations between pairs of quantum systems. However, entanglement and consequently the observed correlations between a higher number of particles are far more complex. The rapidly increasing costs for the entanglement characterisation cause a huge obstacle for the evaluation of experiments and for applications with a growing number of quantum systems.

The aim of our project is thus to design economical and efficient methods for revealing and applying quantum correlations in large systems, and to foster the understanding of these unique quantum features. The cooperation between the Munich and Gdansk groups which will allow a comprehensive approach to solving problems specified in the project – both from the theoretical and the experimental point of view.