

Quantum Isomorphism of Graphs: an Overview

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In this talk I will introduce a quantum version of graph isomorphism. Our point of departure will be an interactive protocol (nonlocal game) where two provers try to convince a verifier that two graphs are isomorphic. Allowing provers to take advantage of shared quantum resources will then allow us to define quantum isomorphism as the ability of quantum players to win the corresponding game with certainty. We will see that quantum isomorphism can be naturally reformulated in the languages of quantum groups and counting complexity. In particular, we will see that two graphs are quantum isomorphic if and only if they have the same homomorphism counts from all planar graphs.