MARIUS JUNGE, Illinois-Urbana Champaign
From Bell inequalities to the Grothendieck program in Operator Algebras

Bell inequalities are of fundamental importance in quantum mechanics, and quantum information theory. In this talk we will show how Bell inequalities for two or three parties are related to classical topics in Banach space and Operator Algebra theory. In particular we will outline the connections between the work of Grothendieck, Tsirelson, Kirchberg and Connes in the context of Bell inequalities, and how the more recent theory of operator spaces and operator systems become relevant. Going from two parties to three parties, we can find arbitrary large violations, i.e. examples where quantum mechanics has the potential to substantially outperform classical systems.

(The talk is based on joint work with David Garcia-Perez, Carlos Palazuelos among others).