Tuesday, March 23, 2021, at 10:00 (Boston)
14:00 (UK/Eire)   15:00 (C.Europe)   22:00 (China)
Mathematical Picture Language Seminar

Zoom at: https://harvard.zoom.us/j/779283357?pwd=MitXVm1pYUlJVzZqT3lwV2pCT1ZUQT09

Noncommutative real algebraic geometry and quantum games
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Abstract: The last two decades produced a substantial noncommutative (in the free algebra) real and complex algebraic geometry. The aim of this subject is to develop a systematic theory of equations and inequalities for noncommutative polynomials of operator variables. The talk will focus on a few topics which bear on quantum games, then shift attention to quantum strategies for XOR games.

Two and three player XOR games historically played a major role, with the Bell inequalities an instance of 2XOR. A family of 3XOR games was the first to illustrate unbounded advantage of quantum strategies. Recent results proved with Adam Bene Watts show that one can decide in polynomial time, whether or not a (perfect) solution exists to 3XOR. We do this with a constructive proof: if a perfect quantum strategy exists, it is achievable in 8 dimensions; but the quantum advantage over a classical strategy is bounded.