Faculty of Science
Department of Physics

Colloquia

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The exclusivity principle: The fundamental theorem of quantum mechanics?

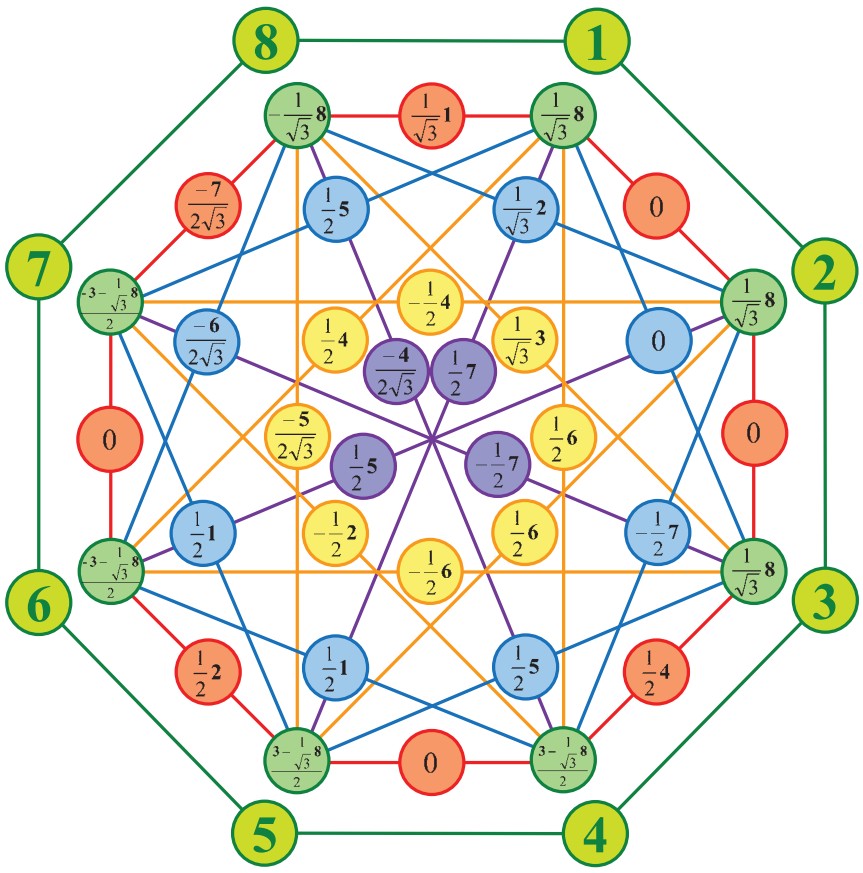
day	location	time
FEB 22, 2017 WED	SU-01	15:40

ABSTRACT

John Bell was the first to provide a proof of the impossibility of local hidden-variable models in quantum mechanics. Quantum theory predicts stronger correlations then the classical ones and this leads to violation of Bell inequalities. On the other hand, quantum systems do not reach the algebraic maximum violation values.

The Exclusivity (E) principle states that the sum of the probabilities of a set of pairwise exclusive events cannot exceed 1. The E principle cannot be derived from Kolmogorov's axioms. Recently, it has been shown that E principle can used to derive maximum violation bounds of certain Bell type inequalities. Since the E principle excludes any set of correlations strictly larger than the quantum set, it might be the fundamental theorem of quantum mechanics in the sense that it can be used to reproduce quantum statistics. A century after its birth, we might be at the dawn of physical understanding of quantum theory.

Zafer Gedik is a 1984 graduate of the Fen Lisesi. He received his BS degree in Physics from the Middle East Technical University in 1987 and he completed his PhD in 1992 at Bilkent University where he was faculty member until 2002. He was visiting scientist at the Johns Hopkins University, IBM Zurich Research Laboratory, CNR Istituto di Cibernetica in Naples, and the National Institute of Standards and Technology in Gaithersburg. He received TÜBİTAK Encouragement Prize (1996), Scientia Europaea Prize , Institut de France, Academie des Sciences (1998), METU Prof. Dr. Mustafa N. Parlar Research Encouragement Award (2001), and TÜBA Young Scientist Award (2002). Since 2002, he is faculty member at Sabanci University.



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