TIFR Centre for Interdisciplinary Sciences
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Seminar

Uncertainty Relations: A Timeline

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The uncertainty principle is one of the most fundamental principles of quantum mechanics and yet a subject of investigation. It encapsulates the impossibility of simultaneous measurement of two incompatible physical observables with arbitrary precision, as the measurement of one disturbs the other. After the mathematical formulation of this principle by Heisenberg for position and momentum operators, it was later put on firm footing for general physical observables by Kennard and rigorously proved by Robertson. Ozawa gave an uncertainty relation that connects error in measurement of one observable and corresponding disturbance in the other observable to the quantum fluctuations of these two observables. Recently, there have been controversies about this error disturbance relation by Ozawa. This debate has been mainly based on the definitions of error and disturbance used in the two approaches. There have been subsequent developments on improving the tightness of the bound provided by Ozawa's error disturbance relation. In this chain, we have given a new error disturbance relation that gives us the best available bound for specific examples. This talk will give a timeline of developments on uncertainty relations followed by our work on error disturbance relations. It will also flash our recent work on su(n) uncertainty relations.

Wednesday, Mar 22nd 2017

4:00 PM (Tea/Coffee at 3:45 PM)

Seminar Hall, TCIS