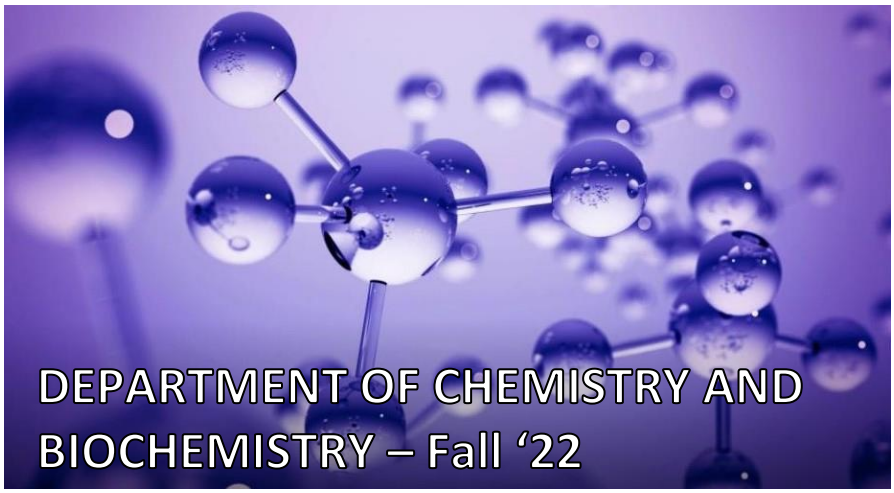

THE SALZBERG CHEMISTRY SEMINAR SERIES

The City College of New York

CREST IDEALS PHASE II

Monday, October 17, 2022 @ 12:00 noon – MR1027

Quantum phase transitions: When the average is no longer good enough

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Abstract: Mesoscopic fluctuations lead to a wide distribution of conductance near the Anderson transition, a quantum phase transition from metals to insulators as a function of disorder. The average conductance no longer describes the system adequately; we argue that a proper description near the transition requires a study of the full distribution of conductance. While standard field-theoretic methods can compute low moments of the distribution like the average or the variance, there is no analytical method currently available to study the full distribution directly. We will introduce a simple model based on random matrix theory that can be used to obtain the full conductance distribution across the transition, providing a solvable example of a quantum phase transition in terms of an order-parameter function.

Biography: Khandker A Muttalib is a Professor of Physics at the University of Florida, Gainesville. He received his B. Sc. (Honors) in Physics and M. Sc. in Theoretical Physics from the University of Dhaka, Bangladesh in 1975 and 1976, respectively. He received his Ph. D. in Physics from Princeton University (with P.W. Anderson) in 1982. After postdoctoral research stints at the James Frank Institute, University of Chicago (with K. Levin); Brookhaven National Laboratory (with V. Emery); and Applied Physics, Yale University (with A.D. Stone), he joined the Department of Physics, University of Florida in 1987. His current research interests are in mesoscopic fluctuations in disordered electronic systems, thermoelectricity, and geometrically frustrated magnets. He is a fellow of the American Physical Society.

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