Speaker: Wu-Yen Chuang (National Taiwan University)

Title: Quantum Riemann-Hilbert problems for the resolved conifold

Abstract: In this talk we introduce the quantum Riemann-Hilbert problems determined by the refined Donaldson-Thomas theory on the resolved conifold. Using the solutions to classical Riemann-Hilbert problems by Bridgeland, we give explicit solutions in terms of multiple sine functions with unequal parameters. The new feature of the solutions is that the valid region of the quantum parameter $q^{1/2}$ varies on the space of stability conditions and BPS t-plane. Comparing the solutions with the partition function of refined Chern-Simons theory and invoking large N-string duality, we find that the solution contains the non-perturbative completion of the refined topological string on the resolved conifold. Therefore solving the quantum Riemann-Hilbert problems provides a possible non-perturbative definition for the Donaldson-Thomas theory.