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ICTS Colloquium

Title : From Homotopical Mathematics to Emergent Geometry

Speaker : Pranav Pandit, University of Vienna, Austria

Date : Wednesday, January 24, 2018

Time : 3:00 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : At the root of the fundamental mathematical notion of symmetry is the idea that it is useful to keep track of the multitude of ways in which two objects can be identified, rather than to simply ask if they are the same. Taking this idea to its logical conclusion leads to a mathematical universe where shapes (homotopy types) are the fundamental building blocks of mathematical structures instead of sets. Derived geometry is geometry in this homotopy-theoretic context. It provides an intuitive language for quantum field theory, and a powerful framework in which "classical geometry" can be seen to emerge from the structure of quantum field theory.

After introducing this paradigm, I will touch upon joint work with Fabian Haiden, Ludmil Katzarkov, and Maxim Kontsevich, in which we attempt to formalize and understand the mathematical structures underlying the physical notion of stability for D-branes in string theory using the language of derived noncommutative geometry. Our work builds upon Bridgeland's notion of stability conditions on triangulated categories, and is inspired by ideas from symplectic geometry, non-Archimedean geometry, dynamical systems, geometric invariant theory, and the Donaldson-Uhlenbeck-Yau correspondence.

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