Intrafaculty Colloquium: Mathematics and Physics

UNI FREIBURG

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Friday 30.01.2015, 14:15, Room 404, Eckerstr. 1

Discrete Dualities in String Theory and Automorphic Forms

String theory is a candidate quantum completion of Einstein's non-renormalisable theory of general relativity. In flat space, string theory contains a finite number of massless modes (corresponding to the standard gravitational degrees of freedom) and an infinite number of massive excitations. These massive excitations modify the standard gravitational scattering amplitudes of general relativity and are thought to be responsible for the improved high energy behaviour of string theory. However, computing these modifications from first principles in a perturbative fashion is not easy. I will present a different approach to computing the modifications that is based on exploiting so-called discrete duality symmetries of string theory. The method has fascinating links to the theory of automorphic forms and representation theory and also gives a handle on non-perturbative effects.

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