ICTS-String Theory Seminar

Title : Constraints on Gravitational Scattering

Speaker : Shiraz Minwalla, Tata Institute of Fundamental Research, Mumbai

Date : Tuesday, August 20, 2019

Time : 11:30 AM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : We explicitly construct the most general four graviton S matrix generated by a local k derivative Lagrangian describing the self interactions of gravitons. In $D \leq 6$ we demonstrate that the Einstein S matix is the only one of this infinite set that grows no faster than s^2 in the Regge (i.e. fixed t) limit. In $D\geq 7$ we demonstrate that there is one additional S matrix with this property, and we construct the same. We then conjecture that the property that S matrices grow no faster than s^2 af fixed t is true of all physically acceptable classical theories. Our conjecture, if correct, implies that Einstein gravity is the only `consistent' local (i.e. finite number of higher derivatives) theory of gravity in $D \leq 6$.