



Department of  
Theoretical Physics

# ***THE QUANTUM SPACETIME SEMINAR***

## **Hidden Symmetries of Scattering Amplitudes in Gauge Theories and Gravity**

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**Date:** May 7<sup>th</sup>, 2018

**Time:** 11:30 am

**Venue:** A-304, TIFR



In this talk we discuss two instances of hidden symmetries in four-dimensional scattering amplitudes. Firstly, we motivate how to obtain simple 4d integrable field theories as limits of planar twisted  $N=4$  super Yang-Mills theory. Amplitudes in these new theories are in one-to-one correspondence with Zamolodchikov's fishnet Feynman graphs and generalizations thereof. Their relation to the planar AdS/CFT duality implies that large families of mostly unsolved Feynman integrals inherit a conformal Yangian symmetry. We then show that also tree-level scattering in ordinary Einstein gravity possesses a hidden conformal Lie algebra symmetry. The inspiration for the latter finding originates in soft limits of string theory scattering amplitudes. Curiously, our formulation of this symmetry relies on a manifestly permutation symmetric form of the graviton amplitude.