SCGP Weekly Talk: Lance Dixon
Tuesday, February 20·1:15 – 2:15pm

Location:102

Title: Scattering Amplitudes from LHC to LIGO and Beyond

Abstract: LIGO, VIRGO, and other gravitational wave interferometers are ushering in a new era of astrophysics, where the messenger is the graviton. The LHC provides the highest energy particle collisions available in the laboratory, searching for new particles and new interactions. These two arenas seem totally unrelated: One is governed by classical gravity, the other by non-Abelian gauge theories such as quantum chromodynamics. However, these two theories are secretly related by a "double copy": graviton scattering amplitudes are essentially the square of gluon amplitudes. Along with modern scattering amplitude methods, which have led to more precise predictions for LHC processes, the double copy has enabled the study of ultraviolet divergences in quantum (super)gravity to high loop orders. The same tools are now being applied to classical gravity, in regimes relevant for improving predictions for gravitational waveforms for inspiralling black holes and neutron stars.