"Spinning black holes versus higher-spin quantum particles" by Justin Vines (AEI)

Date:
Tuesday, December 3, 2019 - 4:00pm
Series:
TEP Seminar

The past decade has brought significant progress in understanding perturbative approaches [post-Newtonian, post-Minkowskian, post-test-body, ...] to the (spinning) binary black hole problem in classical general relativity (GR). Many such results have already been used in the analysis of the first gravitational wave signals from merging binaries detected by LIGO-Virgo, while analyses of future signals will require ever more accurate predictions of waveforms, including regions of the parameter space currently inaccessible to direct computational assaults ("numerical relativity"), with the hope of being able to place ever tighter constraints on deviations from GR. We will review some of this progress, and highlight some stumbling blocks, focusing on effects of the black holes' spins. A particularly promising avenue has been to use insights from scattering amplitudes in quantum field theories to further the study of classical interacting black holes, exploiting an apparent correspondence between "minimally coupled" higher-spin quantum particles and spinning black holes in classical GR. We will scrutinize this correspondence, summarizing its successes and pointing out its current shortcomings.

Location:
PAB 4-330