APR20-2020-020114

Abstract for an Invited Paper
for the APR20 Meeting of
the American Physical Society

Spinning Black Holes Versus Quantum Higher-Spin Particles

JUSTIN VINES, Max Planck Institute for Gravitational Physics, Potsdam

A growing research program seeks to obtain new results concerning the classical gravitational dynamics of black holes from advanced techniques for computing scattering amplitudes in quantum field theories, having in mind applications in gravitational-wave astronomy. At least perturbatively, a nonspinning black hole is well described by an effective point-particle worldline action coupled with the Hilbert action, and this corresponds to a classical limit of a quantum massive scalar field/particle minimally coupled to gravitons. Effective classical descriptions of spinning black holes seem to similarly correspond to "minimally coupled" higher-spin (indeed infinite-spin) massive fields/particles. I will discuss the nature of this observed but unexplained correspondence, the evidence for it, and its novel results, while pointing out the current frontiers of understanding.