CUPhysics

Physics Theory Seminar

Monday, January 29, 2018 / Pupin Hall Theory Center, 8th Floor / 2:10 PM

"Gravitational radiation from classical QCD"

Walter Goldberger, Yale University

I begin this talk by discussing perturbative classical solutions of the Yang-Mills equations coupled to dynamical point particles carrying color charges. By applying a set of color-to-kinematics replacement rules first introduced by Bern, Carrasco and Johansson (BCJ) in the context of scattering amplitudes, these are shown to generate solutions of d-dimensional string gravity, which we also explicitly construct. Agreement between the gravity result and the gauge theory double copy implies a correspondence between non-Abelian particles and gravitating sources with dilaton and axion charges. When the color sources are spineless and highly relativistic, dilaton and axion exchange decouples, and the solutions we obtain match those of pure gravity. I comment on possible implications of our findings to the calculation of gravitational waveforms in astrophysical black hole collisions, directly from computationally simpler gluon radiation in Yang-Mills theory.