Abstract Submitted
for the SES20 Meeting of
The American Physical Society

Angular Momentum in Asymptotically Flat Spacetimes[1] ARWA ELHASHASH, DAVID NICHOLS, Univ of Virginia — The symmetries of asymptotically flat spacetimes in general relativity can be described by Bondi-Metzner-Sachs group and its proposed extensions. Each symmetry is associated with a conserved charge that characterizes the spacetime. These charges include energy-momentum, relativistic angular momentum, supermomentum and super-angular momentum. We focus on the angular momentum. There have been several formalisms that lead to different definitions of angular momentum. These definitions give inequivalent values of the angular momentum for the same spacetime. They can be summarized in a two-parameter family dependent expression. Requiring the angular momentum to vanish in flat spacetime restricts the two parameters to be equal. However there is no obvious physical or mathematical reason to fix this one remaining free parameter to a particular value. We further examine if one allowed this one parameter to be free how much of an effect it would have on the super-angular momentum for non-spinning binary black hole mergers. We use an inspiral-merger-ringdown waveform and estimate that effect to cause 1 part in 10^5 change in the super-angular momentum for equal mass binary and gets smaller with increasing mass ratios.

[1]This work was supported by NSF Grant PHY-2011784.

Arwa Elhashash
Univ of Virginia

Date submitted: 18 Oct 2020 Electronic form version 1.4