

Miami Physics Conference 2022

Oscar Barrera

Title: Ancestral Black Holes of Binary Merger GW190521

GW190521 was the most massive black hole merger discovered by LIGO/Virgo so far, with masses in tension with stellar evolution models. A possible explanation of such heavy black holes is that they themselves are the remnants of previous mergers of lighter black holes. Here we estimate the masses of the ancestral black holes of GW190521, assuming it is the end product of previous mergers. We find that the heaviest parental black holes has a mass of $\{56\}_{-18}^{+20} M_{\odot}$ (90% credible level). We find 70% probability that it is in the $50 M_{\odot}$ – $120 M_{\odot}$ mass gap, indicating that it may also be the end product of a previous merger. We therefore also compute the expected mass distributions of the "grandparent" black holes of GW190521, assuming they existed. Ancestral black hole masses could represent an additional puzzle piece in identifying the origin of LIGO/Virgo/KAGRA's heaviest black holes.