

Abstract Submitted
for the APR18 Meeting of
The American Physical Society

On the Progenitor of Binary Neutron Star Merger GW170817

MICHAEL ZEVIN, Northwestern Univ, LIGO SCIENTIFIC AND VIRGO COLLABORATION — The groundbreaking observation of a neutron star merger in both gravitational waves and electromagnetic radiation enabled the first multi-messenger constraints on the progenitor of a compact binary. By combining the mass measurements from gravitational waves with the host galaxy properties and offset of merger from electromagnetic observations, it becomes possible to place constraints on the progenitor birth location within its host galaxy, masses and orbital properties of the progenitor system prior to the second supernova, and physical mechanisms governing the supernova explosion that created the compact binary. To achieve such inference, we simulate millions of potential progenitor systems and follow the three-dimensional kinematic evolution from binary neutron star birth to the merger time, including the effect of the supernova explosion and pre-supernova galactic motion. We find progenitor constraints comparable to those for binary neutron stars in the Milky Way. These constraints are insensitive to the galaxy's star formation history, provided the stellar populations are older than 1 Gyr.

Michael Zevin
Northwestern Univ

Date submitted: 10 Jan 2018

Electronic form version 1.4