Contribution ID: **564** Type: **Invited talk in the parallel session**

Diversity of Kilonova Emission from Binary Neutron Star Mergers

Monday, 5 July 2021 17:00 (30 minutes)

The outcome of a binary neutron star depends sensitively on the mass of the binary and the equation of state of dense nuclear matter. All else being equal, lower mass binaries tend to produce rapidly rotating magnetar remnants that survive longer (if not indefinitely) before collapsing into black holes. I will discuss some of the implications of the resulting diversity imprinted by a range of binary masses on the properties of the kilonova emission. A long-lived remnant can influence the kilonova properties in a number of ways, ranging from the impact of strong neutrino irradiation from the remnant on the composition of the ejecta (and hence the colors of the kilonova imprinted by the ejecta opacity) to contributing an additional source of luminosity from a rotationally-driven outflow in excess of that from radioactivity alone. Insofar as the properties of a putative relativistic jet would also influenced by the remnant lifetime, we should expect close connections between the non-thermal (e.g. afterglow) and thermal kilonova signatures of the merger.

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Session Classification: Electromagnetic Counterparts of Compact Binary Mergers

Track Classification: Fast Transients: Electromagnetic counterparts of compact binary mergers