

Are kilonovae standardizable candles?

Kilonovae are electromagnetic transients produced by merging binary neutron stars. They are modeled using the fireball model in which radioactive decay of synthesized neutron-rich elements heat up the ejecta and power the light curve. This model is consistent with the recent observations of the binary neutron star merger GW170817. Interestingly, Type Ia supernovae are also powered by radioactive decay of Nickel-56, a major fraction of which is produced from binary white dwarf mergers. Although the complex physics of Type Ia supernovae is not well understood, empirically found correlations in their light curves allow us to use them as standardizable candles. It is natural to ask whether kilonovae also show such correlations that can be used to make them standard candles. We investigate this for a range of binary neutron star masses to find the systematic behavior in their light curve and their possible astrophysical applications.