Contribution ID: **63** Type: **Oral contribution**

On the hosts of neutron star mergers in the nearby Universe

Wednesday, September 28, 2022 11:00 AM (20 minutes)

In the last years, with the advent of multi-messenger astrophysics, the characterisation of binary systems of neutron stars has become central in various fields such as gravitational waves, gramma-ray bursts (GRBs), and the chemical evolution of galaxies. In this work, we explore possible observational proxies that can be used to infer some characteristics of the delay time distribution (DTD) of neutron star mergers (NSMs). To do that, we construct a sample of model galaxies that fulfils the observed mass distribution function, star formation rate versus mass relation, and the cosmic star formation rate density. The star formation history of these galaxies is described with a log-normal function characterised by the logarithmic delay time (t_0) and the width of the function itself (τ). For the NSMs, we assume a theoretical DTD that mainly depends on the lower limit and the slope of the distribution of separation of the binary neutron stars systems at birth. We find that the current present rate of NSMs ($\mathcal{R} = 320^{+490}_{-240}$ Gpc^{-3}yr^{-1}) requires that ~ 0.3 per cent of neutron star progenitors lives in binary systems with the right characteristics to lead to a NSM within a Hubble time. The fraction of short-GRBs observed in late-type galaxies favours DTDs with a fair fraction of prompt events, along the lines suggested by chemical evolution models.

Primary author: CAVALLO, Lorenzo

Presenter: CAVALLO, Lorenzo

Session Classification: Session 5