



Contribution ID: 277

Type: **Talk in a parallel session**

Prospects for multi-messenger observations of binary neutron star mergers in the fourth LIGO-Virgo-KAGRA observing run

Tuesday, 9 July 2024 17:00 (15 minutes)

On August 17, 2017, the joint detection of GW170817 and GRB 170817A opened the era of multi-messenger astronomy with gravitational waves (GWs) and provided the first direct probe that at least some binary neutron star (BNS) mergers are progenitors of short gamma-ray bursts (S-GRBs). Since then, no other joint BNS/S-GRB observations have been reported. On May 2024 the fourth LVK observing run (O4) has started, and it will last at least until February 2025: many other GW detections are expected in the next months, and possibly this will lead to another multi-messenger event.

In this talk I will present a comprehensive study on the expected joint GW and electromagnetic (EM) observations of BNS mergers in O4. This work combines accurate population synthesis models with simulations of the expected GW signals and the associated S-GRBs. We consider different assumptions about the GRB jet structure and we estimate the expected joint GW and EM detection rates with Fermi, Swift, INTEGRAL and SVOM. The comparison of the theoretical predictions of this work with the O4 observations will be key to probe the physics of BNSs, as well as the BNS/S-GRB association and the GRB jet structure.

Primary author: PATRICELLI, Barbara

Presenter: PATRICELLI, Barbara

Session Classification: Modeling of binary neutron star and black hole-neutron star mergers, and of their electromagnetic counterparts

Track Classification: Gamma-Ray Bursts (GB): The SVOM mission in the time-domain era