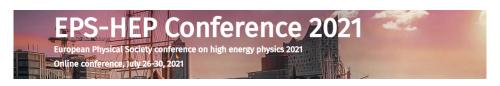Contribution ID: **1140**   Type: **Parallel session talk**

Multimessenger Analysis Strategy for Core-Collapse Supernova Search: Gravitational Waves and Low-energy Neutrinos

Wednesday 28 July 2021 17:05 (20 minutes)

Core-collapse supernovae are fascinating astrophysical objects for multimessenger studies. Gravitational waves (GWs) are expected to play a role in the supernova explosion mechanism, but their modelling is also challenging due to the stochastic nature of the dynamics and the vast possible progenitors, and moreover, the GW detection from these objects is still elusive with the already advanced detectors. Low-energy neutrinos will be emitted enormously during the core-collapse explosion and can help for the gravitational wave counterpart search. In this work we develop a multi-messengers strategy to search for such astrophysical objects by exploiting a global network of both low-energy neutrino and gravitational wave detectors. First, we discuss how to improve the detection potential of the neutrino sub-network by exploiting the temporal behaviour of a neutrino burst from a core-collapse supernova. Then, we combine the information provided by GW and neutrino in a multi-messenger strategy. Our method can better disentangle from noise the low statistical signals coming from weak (or far) supernovae giving us about 10^3 lower \textit{false-alarm-probability} for recovered signal injections.

Carlo Vigorito, Claudio Casentini, Giulia Pagliaroli, Marco Drago, Odysse Halim, and Viviana Fafone

Collaboration / Activity

None

First author

Email

Primary author: HALIM, Odysse

Presenter: HALIM, Odysse

Session Classification: T01: Astroparticle and Gravitational Waves

Track Classification: Astroparticle and Gravitational Waves