Contribution ID : **295** Type : **Talk in parallel session**

# Looking for Core-Collapse Supernovae with Gravitational Waves and Low-energy Neutrinos

*Thursday, 2 September 2021 17:45 (15)*

Core-collapse supernovae are fascinating astrophysical objects for multimessenger studies. Gravitational waves (GWs) are expected to play a role in the supernova explosion mechanism, however their complex modelling makes the detection very challenging. 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. We also improve the detection potential of the neutrino sub-network by exploiting the temporal behaviour of a neutrino burst from a core-collapse supernova. We show that with the proposed approach neutrino detectors can gain at least 10% of detection efficiency at the distance where their efficiency drops. Then, we combine the information provided by GW and neutrino in a multi-messenger strategy. In particular, we obtain an increase of the probability to detect the GW signal from a CCSN at 60 kpc from zero when using only GW analysis to ~33% with our combined GW-ν approach.

## Reference to paper (DOI or arXiv)

## Your gender (free text)

**Primary author(s) :** Dr. HALIM, Odysse (INFN Trieste); Dr. DRAGO, Marco (Univ of Rome La Sapienza and INFN Rome); SCHOLBERG, Kate (Duke University); Prof. FAFONE, Viviana; Dr. CASENTINI, Claudio; Dr. VIGORITO, Carlo; PAGLIAROLI, Giulia (INFN)

**Presenter(s) :** PAGLIAROLI, Giulia (INFN)

**Session Classification :** Discussion Panel Gravitational Waves 3

**Track Classification :** Gravitational Waves