Contribution ID: **25**   Type: **Poster**

Sub-threshold Gravitational Wave counterpart search with IceCube sub-TeV neutrinos

Since the release of the Gravitational Wave Transient Catalogue, GWTC-2.1 by the LIGO-Virgo collaboration, sub-threshold gravitational wave (GW) candidates are publicly available. They are expected to be released in real-time as well, in the upcoming O4 run. Using these GW candidates for multi-messenger studies complements the ongoing efforts to identify neutrino counterparts to GW events. This in turn, allows us to schedule electromagnetic follow-up searches more efficiently. However, the definition and criteria for sub-threshold candidates are pretty flexible. Finding a multi-messenger counterpart via archival studies for these candidates will help to set up strong bounds on the GW parameters which are useful for defining a GW signal as sub-threshold, thereby increasing their significance for setting up follow-up searches. Here, we present the current status of this ongoing work with the IceCube Neutrino Observatory. We perform a selection of the sub-threshold GW candidates from GWTC-2.1 and conduct an archival search for sub-TeV neutrino counterparts detected by the dense-infill array of the IceCube Neutrino Observatory, known as "DeepCore". An Unbinned Maximum Likelihood method is used for this. We report the 90% C.L. sensitivities of this sub-TeV neutrino dataset for each selected sub-threshold GW candidate, considering spatial and temporal correlation between the GW and neutrino events within a 1000 s time window.

Author: MUKHERJEE, Tista (Karlsruhe Institute of Technology (KIT))

Presenter: MUKHERJEE, Tista (Karlsruhe Institute of Technology (KIT))

Session Classification: Poster Session