Form 8

Research Result Report
ICRR Inter-University Research Program 2023

Research Subject: Study the Gravitational Wave with the Most Modern Techonology

Principal Investigator: Lupin Chun-Che Lin

Participating Researchers: None

Summary of Research Result :

1. My student and I worked on the search of CBC signal using the CNN with different concerns including different training sets, different SNR distributions of samples and different architectures to judge the efficiency in deep learning.
2. My student and I joined the collaboration of SPIIR team of UWA (university of western Australia), and we worked on the upgrade of the GW-Skylocator code to determine the sky localization of GW events using the deep learning.
3. My collaborator and I have developed the template-free methods including the sHHT (stacked Hilbert-Huang transform) and ARIMA (autoregressive integrated moving average) to resolve the GW signal. The publications can be referred to:
   I. Hu, C.-P., Lin, Lupin C. C., Pan, K.-C., Li, K.-L., Yen, C.-C., Kong, Albert K. H., and Hui, C. Y., 2022, ApJ, 935, 2, 127
   II. Kim, S., Hui, C. Y., Yan, J. Leung, Alex P., Oh, K., Kong, Albert K. H., Lin, Lupin C. C., and Li, K.-L., 2024, 109, 10, 102003
4. The 50-cm telescope on the Lulin mountain is now well set up to trace the EM afterglow of the GW transient event.
5. The PI is also the co-chair of the KAGRA open data group. By the efforts in collaboration with LIGO and Virgo partners, we have
   I. hosted the 2023 GW open data workshop
   II. prepared the community catalog of the detected GW events on the GWOSC website
   III. published the O3 open data paper
   (ref. Abbott, B. P. (LIGO + Virgo + KAGRA collaboration), and et al., 2023, ApJS, 267, 29.)

No.