

# Localization of gravitational waves using machine learning

*Tuesday, 24 May 2022 13:30 (2 hours)*

An observation of gravitational waves is a trigger of the multi-messenger search of an astronomical event. A combination of the data from two or three gravitational wave detectors indicates the location of a source and low-latency data analysis is key to transferring the information to other detectors sensitive at different wavelengths. In contrast to the current method, which relies on the matched-filtering technique, we proposed the use of machine learning that is much faster and possibly more accurate than matched filtering.

Our machine-learning method is a combination of the method proposed by Chatterjee *et al.* and a method using the temporal convolutional network.

We demonstrate the sky localization of a gravitational-wave source using four detectors: LIGO H1, LIGO L1, Virgo, and KAGRA, and compare the result in the case without KAGRA to examine the positive influence of having the fourth detector in the global gravitational-wave network.

**Primary author:** SASAOKA, Seiya (Tokyo Institute of Technology)

**Co-authors:** HOU, Yilun (Tokyo Institute of Technology); Dr SOMIYA, Kentaro (Tokyo Institute of Technology); Prof. TAKAHASHI, Hiroataka (Tokyo City University)

**Session Classification:** Poster session I

**Track Classification:** R&D for early warning