

Global hunt to detect collisions in space

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The results of a long-term observation campaign to detect the collision of compact objects in the universe has been announced by a global collaboration including The University of Western Australia.

The collaboration allowed researchers to perform a targeted search for the sources of gravitational waves detected by the world's largest gravitational wave observatory, the Laser Interferometric Observatory.

The search revealed that all of the sources targeted are most likely optically "dark," suggesting most cosmic collisions between black holes remain hidden to conventional telescopes.

UWA and the University of Paris coordinated an approach to control multiple facilities and observatories around the world which allowed for the continuous scanning of the sky, and published the results in *Monthly Notices of the Royal Astronomical Society*.

The collaboration named GRANDMA is a multi-national network of 25 robotic telescopes from 12 countries with the electromagnetic capability to follow-up gravitational waves.

The ability to detect sources of gravitational waves is relatively new and while several have now been detected, only one has been observed through an optical [telescope](#).

The elusiveness of these objects is due to the uncertainty of their exact location which can have a difference of thousands of square degrees in space, similar to searching for a boat somewhere in the middle of the ocean.

Dr. Bruce Gendre from UWA's Center of Excellence for Gravitational Wave Discovery said the initiative highlighted the importance of having a network of dedicated telescopes that could contribute to global knowledge.

"Australia, like several other countries, is focused on studying the sources of [gravitational waves](#), however most communities are working solo," Dr. Gendre said.

"The problem is that everyone is currently trying to find a needle in the same, incredibly large, haystack. GRANDMA is the first [collaboration](#) to split the haystack into small piles and focus resources on time-domain astronomy."

The researchers also established the program Amateur Kilonova Catcher that allowed anyone with a telescope to report their observations.

The next round of observations will commence in 2021.

More information: S Antier et al. GRANDMA Observations of Advanced LIGO's and Advanced Virgo's Third Observational Campaign, *Monthly Notices of the Royal Astronomical Society* (2020). [DOI: 10.1093/mnras/staa1846](https://doi.org/10.1093/mnras/staa1846)

Provided by University of Western Australia

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