Project application under the Gravitational-wave Excellence through Alliance Training (GrEAT) Network with China

Lead(s) and collaborator (s): name(s) and institution(s)
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Student name(s) to work in project if applicable: name(s) and institution(s)
Where will the activity be hosted?

Title of activity and description of the project (50-100 word summary - suitable for reporting to STFC)
Sky localisation of transient gravitational wave signals by space gravitational wave observatories The ability for space gravitational wave observatories such as LISA, Taiji and TianQin, to measure the properties of binary black hole interactions and merger has been well studied over the years. The sky localisation of these systems is typically well determined for a single observatory since the associated gravitational wave signal is expected to observed over timescales of months to years. However, for very short transient signals (eg a few cycles at frequencies of 1 mHz), the sky localisation is more challenging, especially in the absence of well parameterised models that can be used for parameter estimation analyses. This project aims to adapt transient gravitational wave analysis methods, currently used for analysis of LIGO data, for use on data from space gravitational wave observatories. The space gravitational wave observatories, operating in isolation and as part of the network, will be used to infer properties of systems that emit very short transient gravitational waves frequencies around the 1 mHz. The performance of the space observatories and networks will be characterised.

What would success look like and what are the follow on steps? How will you monitor the project? 50-100 word summary
This study probes a new area of very short transients for space observatories and it will very possibly lead to a joint publication. Such a publication will likely form the basis of new work following up on the outcomes of this initial research. It would be also good to have exchange visits of team members involved in this project which will help build and strengthen links between the groups in this new direction of research.

For questions/comments and submission please contact Prof. Ik Siong Heng (ik.heng@glasgow.ac.uk) Dr. Mariela Masso Reid (Mariela.MassoReid@glasgow.ac.uk)and Prof. Zong-Hong Zhu (zhuzh@bnu.edu.cn).