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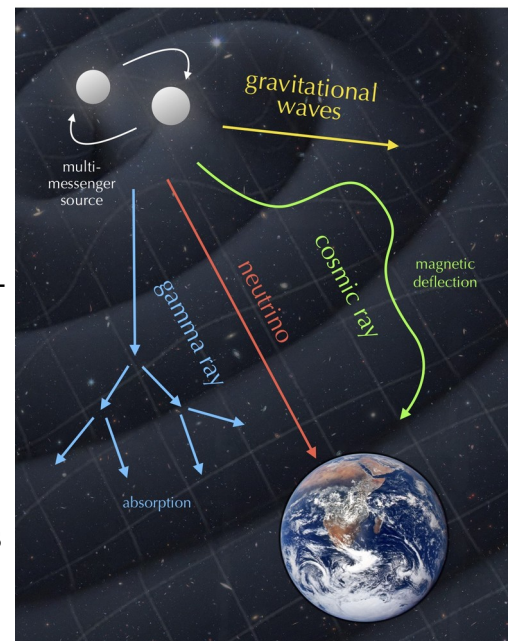
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RISE PROJECT: STUDYING GRAVITATIONAL WAVE AND NEUTRINO DATA

Participation in the following project offers introduction to multi-messenger studies using gravitational wave (GW) data from LIGO-Virgo and neutrino data from IceCube.

Project Description:

In the present era, the Astroparticle physics community is engaging more and more with multi-messenger studies, to gain more insight about the long-standing unknowns of the high-energy Universe. KIT, being a member of the IceCube collaboration, has access to the astrophysical neutrino data obtained by the IceCube detector, located in Antarctica. The GW data is publicly available, thanks to the LIGO-Virgo-KAGRA collaboration. Our group at KIT is also a member of next generation GW detector, the Einstein Telescope, which is currently under development. To proceed with future Astroparticle physics studies, here at KIT, we are doing multi-messenger studies with GW and neutrino data. With this aim, in this project, we will start with understanding the existing public GW data and the analysis pipelines. Next steps would be to identify the important parameters for multi-messenger studies with respect to both GW and neutrino datasets. Finally, we can also extend our work to do efficient multi-messenger studies to identify common astrophysical sources of GW and neutrinos, keeping in mind the future situation when next generation detectors will be online. With the course of this project, the student will get familiar with necessary concepts of astrophysics, statistical as well as with programming techniques. Strong interest in astrophysics and Python programming is expected.



More about Karlsruhe:

Karlsruhe is a friendly city, near French-German border, in Baden-Württemberg. The marvellous Karlsruhe Palace is located at the center of the city, surrounded radially by many streets with shops and restaurants. Among the many universities are located in Karlsruhe, Karlsruhe Institute of Technology (KIT) is the oldest German technical one, with a highly ranked Faculty of Physics. Other than being famous for its academic environment, Karlsruhe is situated in an attractive touristic region, serving as the gateway to the Black Forest.



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