Data Analysis Mini Workshop

ET Community Meeting October 21 2022

Hannover

Chaired by Frank Ohme (MPI Grav Physics Hannover)

1. Participants

Sina Köhlenbeck (MPI Grav Physics Hannover)

Shichao Wu (MPI Grav Physics Hannover)

Arwa Elhashash (University of Virginia)

Wolfgang Kastaun (MPI Grav Physics Hannover)

Kristen Lackeos (MPI Radioastronomy)

Johannes Erdmann (RWTH Aachen)

Markus Bachlechner (RWTH Aachen)

Shrobana Gosh (MPI Grav Physics Hannover)

Andreas Ringwald (DESY)

Frank Ohme (MPI Grav Physics Hannover)

2. Short Introductions

Diverse interests and experiences:

- signal modeling,
- memory effect,
- LISA data analysis,
- LIGO data analysis,
- dark matter searches/exotic sources,
- particle physics,
- processing large data,
- artificial neural networks,
- …

3. Discussion topics

- Shichao summarizes his recent work on mock data for 3G detectors: https://arxiv.org/abs/2209.03135

- Shrobana presents slides on 3G challenges: many signals, waveform model systematics, testing nature of compact binaries, dark matter candidates

- Johannes presents slides on ideas to use his experience in handling large data sets (especially with deep neural networks) to process 3G gravitational-wave (GW) data. Discussion about identifying source parameters in a Bayesian framework using neural networks.

- Wolfgang presents slides on his potential contributions to ET: equation-of-state framework, neutron-star simulations and outreach

4. Conclusions

- There is great interest and excitement in the potential of ET, but lack of concrete data-analysis tasks to tackle now

- Mock data would be extremely useful as testbed and easy entry point for new analysts starting to work with GW data

- Other suggestions for the ET community:
  - provide guidance on what is desired, how and where to contribute.
  - Organize data-analysis workshop to exchange ideas,
  - establish new collaborations,
  - train people, etc.