

Annual Report

Anirudh S. Nemmani

Supervisors -

Dr. hab. Michał Bejger
Dr. hab. Brynmor Haskell

Introduction

- Bachelors and Masters from Indian Institute of Science Education and Research Tirupati (IISERT)
- Master's thesis at Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune
- Now a PhD at CAMK PAN, Warsaw
 - Dr. hab. Michał Bejger
 - Dr. hab. Brynmor Haskell



Previous Works

- **Exploring Eccentric Gravitational waves in Deci-Hertz Gravitational wave detectors**

Dr Apratim Ganguly (IUCAA), Dr Anuj Mishra (ICTS), Dr Bhooshan Gadre (Utrecht U.)

- Systematic biases in different tests of GR - IMRCT, Inspiral tests
- LGWA, DECIGO, LIGO and Virgo detectors

- **Testing Isolated microlensing template on strong lensed + microlensed GW signals**

Dr Apratim Ganguly (IUCAA), Dr Anuj Mishra (ICTS), Anirban Kopty (IUCAA)

- Microlensing effects over strong lensing effects
- Recovery of lensing parameters using fitting factors, currently new faster PE is being done by Anirban Kopty using GWMAT and Relative binning.

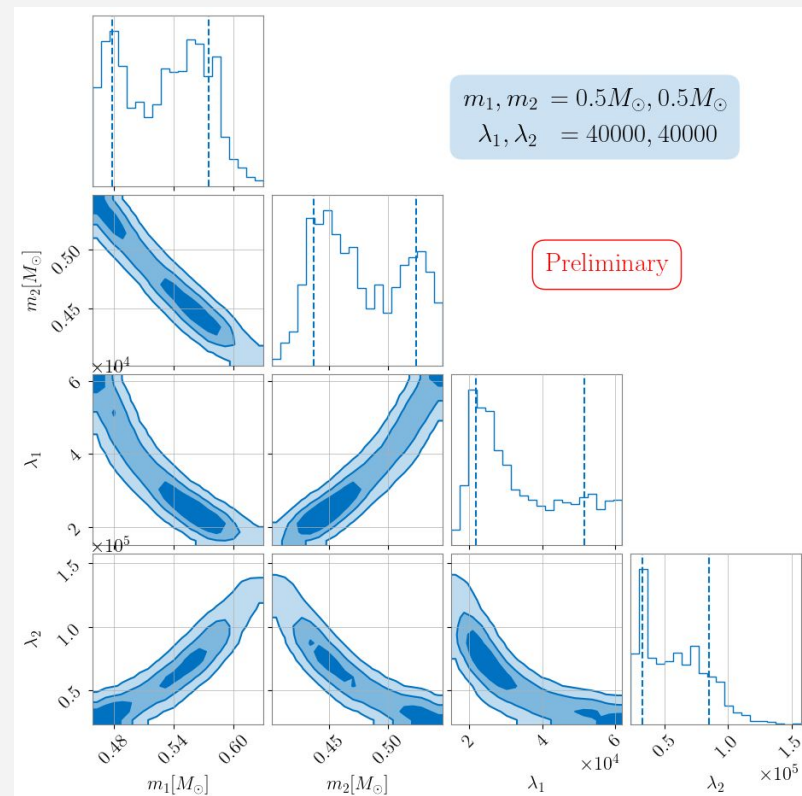
- **Classification of HI Absorption spectra using machine learning (Submitted, in review)**

Dr Debasish Mondal (IISERT), Dr Arunima Banerjee (IISERT), Dr Rajeshwari Dutta (IUCAA)

- We used data from GMRT and WSRT and trained on different machine learning models

Recovering/Classifying Subsolar Mass Compact Binaries

- Our main idea is to differentiate the compact binary system composed of sub-solar mass material objects (like quark stars) or black holes.
 - This is also motivated by long-duration GW searches and dark matter searches (primordial BHs)
- The differentiator is the tidal deformability
 - Compact stars in this mass range have very high tidal deformability, i.e. quark stars
- We also plan to understand at what distances we can actually constrain tidal deformability to differentiate stars from black holes in ET detector configuration.



Thank you

