

10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)



Contribution ID: 315

Type: **Oral**

Can LIGO Detect Non-Annihilating Dark Matter?

Dark Matter (DM) is ubiquitous and thus has been proposed to be probed by several terrestrial and celestial detectors. DM particles from the galactic halo can accumulate in Neutron Stars (NS) and transmute them into sub-2.5 solar mass black holes (BH) if the DM particles are heavy, stable, and have feeble but sufficient interactions with nucleons. These BHs are named Transmuted Black Holes (TBHs). Null detection of these TBH-TBH mergers from LIGO's low mass BH search can exclude an interesting parameter space in the DM particle mass (m_{χ}) vs. interaction strength with nucleons ($\sigma_{\chi n}$) plane. These exclusion limits depend on the priors chosen on DM parameters and the currently uncertain Binary Neutron Star (BNS) merger rate density, precisely on the merger rate density of the low mass compact object binaries. The prospect of using Gravitational Wave (GW) detectors as a non-annihilating DM detector is found to be very positive given continued null detection and with increased sensitivity (50 times the current sensitivity) over the next decade.

Email

sulagna@theory.tifr.res.in

Affiliation

Tata Institute of Fundamental Research, Mumbai

Author: Ms BHATTACHARYA, Sulagna (Tata Institute of Fundamental Research, Mumbai)

Presenter: Ms BHATTACHARYA, Sulagna (Tata Institute of Fundamental Research, Mumbai)

Session Classification: Gravitational Waves

Track Classification: Gravitational Waves