Contribution ID: **237** Type: **Talk in a parallel session**

# Why CGW is yet to be detected from isolated magnetized rotating neutron stars?

*Tuesday, 9 July 2024 17:40 (40 minutes)*

There are evidences for neutron stars (NSs) with the rotational frequency of several 100th of Hz and moderate magnetic fields, though magnetars are slowly spinning. Hence, if their magnetic and rotating axes are misaligned (nonzero obliquity angle), hence they are pulsars, then they should be potential sources for continuous gravitational waves (CGWs), along with their electromagnetic emissions. However, so far we have not detected a single NS by CGW. In this talk, based on our ApJ 955, 19 (2023), I will address the physical implausibility of detecting CGWs from isolated NSs. I will explore the decays of magnetic field, angular velocity, and obliquity angle with time, due to the Hall, Ohmic, ambipolar diffusion and angular momentum extraction by GW and dipole radiation, which determine the timescales related to the GW emission. Further, in the Alfvén timescale, a differentially rotating, massive proto-NS rapidly loses angular momentum to settle into a uniformly rotating, less massive compact objects due to magnetic braking and/or viscous drag. These explorations suggest that the detection of NSs is challenging and sets a timescale for detection. We calculate the signal-to-noise ratio of GW emission, which confirms that any detector may not detect them immediately, but they may detectable by Einstein Telescope, Cosmic Explorer over months of integration time, leading to direct detection of NSs. Basically, the fast decay of the obliquity angle, that makes isolated NSs practically undetectable by CGW.

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**Session Classification:** Astrophysics with gravitational waves

**Track Classification:** Gravitational Waves (GW): Astrophysics with gravitational waves