

# Probing ultra-dense matter with gravitational waves

*Thursday, 19 September 2024 09:00 (50 minutes)*

The first detection of gravitational waves from a merging neutron star binary system and the accompanying observations of electromagnetic counterparts in 2017 demonstrated the enormous potential of multi-messenger astronomy for understanding the properties of ultra-dense matter. Neutron stars –relict of the gravitational collapse and subsequent supernova explosion of a massive star at the end of his life– comprise the highest densities of matter that can stably exist in the Universe. During this talk, I will discuss the possibilities for insights on matter under these extreme conditions from future detections of the gravitational wave signals emitted from events involving neutron stars. In particular, results will be shown illustrating the capacity of multi-messenger observations to give us hints about a possible phase transition in neutron star matter.

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