

Environmental effects and matter systematics for low-frequency gravitational wave astronomy

Thursday, 21 September 2023 09:00 (30 minutes)

Despite the groundbreaking discoveries of the LIGO-Virgo-KAGRA collaboration, the full frequency spectrum of the gravitational wave sky is still largely unknown. The Einstein Telescope will push observations on Earth down to the seismic noise, while LISA will open a window on the mHz gravitational wave band from space. At the same time, pulsar timing arrays, which have just detected a stochastic background signal, will keep exploring the gravitational wave universe at nHz frequencies. This forthcoming wealth of data requires not only waveform templates of exquisite precision, but also to revisit the commonly held assumption that gravitational wave signals are insensitive to the surrounding ambient medium. I will present examples in which the matter environment may affect, directly and indirectly, the gravitational wave signals from various sources for pulsar timing arrays, LISA and possibly ET. I will argue that a complete understanding and modeling of these effects is crucial for making gravitational astronomy a precision science in the next decade.

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Session Classification: Environmental Effects