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What can we learn from the low-frequency spectrum of causal gravitational waves?

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In the future, Stochastic Gravitational Wave Background can be measured by LISA. If the signal turns out to be produced by a causality-limited process such as a first-order phase transition, then the shape of its low-frequency spectrum would be independent of the details of the production mechanism. The slope of this low-frequency tail would encode information about the equation of state and the free streaming content of the universe at early times.

In this talk, we will show that future experiments such as LISA and DECIGO would be able to access this information and give us an unprecedented insight into the physics at temperatures $10^5 - 10^{10}$ GeV.

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