Contribution ID: **566** Type: **not specified**

A New Probe of Relic Neutrino Clustering using Decaying Heavy Dark Matter

Thursday 16 May 2024 14:00 (15 minutes)

The existence of relic neutrino background is a strong prediction of big bang cosmology. But because of their extremely small kinetic energy today, the direct detection of relic neutrinos remains elusive. On the other hand, we know very little about the nature of dark matter. In this work, we show that heavy dark matter (with mass in the range of 10^9 to 10^{15} GeV) decaying into neutrinos will provide a new probe of relic neutrinos via resonant neutrino scattering. We find that the distinct resonant absorption feature is potentially observable in the next-generation ultra-high energy neutrino telescopes (such as IceCube-Gen2) for a relic neutrino overdensity comparable to the current laboratory limits.

Mini Symposia (Invited Talks Only)

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Session Classification: Neutrino Physics

Track Classification: Neutrino Physics