

Probing Gravitational Waves Using Neutrino Flavor Oscillations

Tuesday 4 June 2024 14:30 (20 minutes)

Gravitational waves can affect neutrino oscillation probabilities and may hence be detectable at neutrino telescopes. We propose a heuristic model describing the influence of gravitational waves on the propagation and flavor oscillations of neutrino wave packets.

This model is based on the assumption that at lowest order in the metric perturbation caused by the gravitational wave only the average propagation distance of the neutrino system is affected. In combination with an averaging procedure over the time of data taking of the neutrino experiment this leads to a damping of the neutrino flavor oscillations, if certain criteria are met.

Therefore, considering the imprints of gravitational waves in the flavor transition probabilities of high energy neutrinos from pulsars located in our Galaxy might pave the way for new discoveries in the quickly expanding field of multi-messenger astronomy.

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Session Classification: Parallel Session PL.3