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Impact of Wave Packet Separation in Low-Energy Sterile Neutrino Searches

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Analyses of neutrino oscillations experiments usually rely on the standard probability formula, which assumes that neutrino wave functions can be approximated by plane waves and neglects any decoherence effect. This expression is valid in most regimes, or at least it is in the three neutrino paradigm.

In this talk, we will re-examine this assumption in the context of sterile neutrino oscillations and check that reactor and nuclear decay experiments must not blindly use the standard formula. Instead, it is necessary to acknowledge the phenomenological implications of a possible dampening of the sterile neutrino oscillations. Furthermore, we will see how the tension between reactor and nuclear decay experiments can be slightly relaxed by this effect, which does not necessarily introduce any other new physics.

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Authors: Dr ARGÜELLES DELGADO, Carlos (Department of Physics & Laboratory for Particle Physics and Cosmology, Harvard University); Dr SALVADÓ SERRA, Jordi (Institute of Cosmic Sciences, Universitat de Barcelona); BERTÓLEZ MARTÍNEZ, Toni (Institute of Cosmic Sciences, Universitat de Barcelona)

Presenter: BERTÓLEZ MARTÍNEZ, Toni (Institute of Cosmic Sciences, Universitat de Barcelona)

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