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Probing Fuzzy Dark Matter in Neutrino Experiments

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In this talk we will present novel ways in which neutrino oscillation experiments can probe dark matter. In particular, we focus on interactions between neutrinos and ultra-light (“fuzzy”) dark matter particles with masses of order 10^{-22} eV. It has been shown previously that such dark matter candidates are phenomenologically successful and might help ameliorate the tension between predicted and observed small scale structures in the Universe. We will show that coherent forward scattering of neutrinos on fuzzy dark matter particles can significantly alter neutrino oscillation probabilities and lead to the effects which could be observable in current and future experiments. We present new limits on fuzzy dark matter (both scalar and vector) interacting with neutrinos using data from long-baseline accelerator experiments as well as the solar neutrino data.

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