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Cooling sterile neutrino dark matter

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Sterile neutrinos produced through resonant or non-resonant oscillations are a well motivated dark matter candidate, but recent constraints from observations have ruled out most of the parameter space. Based on general considerations we find a thermalization mechanism which can increase the yield after resonant and non-resonant production. At the same time, it alleviates the growing tensions with structure formation and X-ray observations and even revives simple non-resonant production as a viable way to produce sterile neutrino dark matter. We investigate the parameters required for the realization of the thermalization mechanism in a representative model and find that a simple estimate based on energy- and entropy conservation describes the mechanism well.

Author: Dr VOGL, Stefan

Presenter: Dr VOGL, Stefan

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