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How to make the short baseline sterile neutrino compatible with cosmology (15' + 3')

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A number of short baseline neutrino experiments have found anomalous results throughout the past decades. These can be interpreted as oscillations between the active neutrinos and a sterile neutrino with a mass around 1eV. The individual anomalies are not very significant themselves, but taken together they provide an interesting hint for a new particle beyond the Standard Model.
However, combining a light sterile neutrino with the standard cosmological ΛCDM model would increase the expansion rate of the Universe and the sterile neutrino would act as hot dark matter.
Such modifications to ΛCDM are not compatible with observations of the cosmological microwave background (CMB), large scale structures (LSS) and primordial abundances of the light elements, which show that the Universe is very well described by standard ΛCDM.

In this talk, I will describe how to reconcile a light sterile neutrino with cosmology by introducing a new hidden interaction for the sterile neutrino. An interaction of this type is capable of suppressing oscillations between active and sterile neutrinos in the early Universe, which is otherwise the main production mechanism of steriles. While this leads to good agreement with the light element abundances, the accommodation of current LSS and CMB observations further constrain the model. Despite the constraints, the force mediator can be either a vector boson or a pseudoscalar, although the two options lead to quite different phenomenologies.

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