

EFT approach to sterile neutrino dark matter

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Sterile neutrinos represent a minimal and well motivated extension of the Standard Model (SM). For masses at the keV scale, their mixing to the active neutrinos offers a minimal explanation of the dark matter (DM) density. The very same mixing inevitably leads to radiative photon emission and the non-observation of such peaked X-ray lines virtually rules out this minimal sterile neutrino DM hypothesis.

However, in this talk I will point out that in the context of the SM effective field theory with (light) sterile neutrino (nuSMEFT), higher dimensional operators can produce sterile neutrino DM in a broad range of parameter space. In particular, even in the zero mixing limit the DM density can be explained. On the other hand, nuSMEFT interactions also open the large mixing parameter space. This is because some nuSMEFT operators induce photon dipoles, which can cause destructive interference effects in the X-ray emission. I will further discuss the testability prospect of the nuSMEFT operators and show their correlations to the parameter space of the DM production.

Would you be interested in presenting a poster? (this will not impact the decision on your talk)

no

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