

Dark matter annihilations and 21cm signal

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Summary

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Abstract

Dark matter (DM) annihilations into charged particles change the thermal history of the Universe and, as a consequence, affect the 21 cm signal. In my talk I will discuss how predicting the effect of DM strongly relies on the modeling of annihilations inside halos. Given current uncertainties on the description of the astrophysical processes driving the epochs of reionization, X-ray heating and Lyman- α pumping, we found in a recent work that disentangling DM signatures from purely astrophysical effects, related to early-time star formation processes or late-time galaxy X-ray emissions, will be a challenging task. We have concluded that only annihilations of DM particles with masses of ~ 100 MeV, could leave an unambiguous imprint on the 21 cm signal and, in particular, on the 21 cm power spectrum. Additional measurements of the 21 cm signal at different cosmic epochs should help to break the strong parameter degeneracies between DM annihilations and astrophysical effects in order to undoubtedly single out a DM imprint for masses different from ~ 100 MeV.

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