
Reproducing the latest determinations of the mean free path of ionising photons in CoDa III

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Abstract

Recent determinations of the mean free path of ionising photons (mfp) at $z=6$ are lower than much of the theoretical predictions from Reionization simulations. However, these predictions were performed using simulations without fully coupled radiation and hydrodynamics. We set out to investigate the evolution of mfp in our new massive fully coupled radiation and hydrodynamics cosmological simulation of Reionization with a full speed of light, Cosmic Dawn III (CoDa III). CoDa III's scale (92 cMpc/h per side) and resolution (81923 resolution elements) allow us to follow Reionization on cosmological scales whilst resolving the galaxies in atomic cooling haloes that drive the Reionization process. We find that the late Reionization in CoDa III ($z \approx 5.6$) is in very good agreement with some of the latest global constraints on Reionization. Finally, we show that the CoDa III mfp is in excellent agreement with the most recent observational constraints, showing that fully coupled RHD simulations can explain the most recent determinations of mfp.

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