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Galactic ionising photon budget during the Epoch of Reionization in the radiation-hydrodynamics Cosmic Dawn II cosmological simulation

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A growing consensus seems to point towards the ionising UV light of galaxies having been the main driving force behind the reionisation process. I analysed the ionising photon contribution of galaxies to the intergalactic medium and its relation to galactic properties such as mass and star formation in the Cosmic Dawn II simulation, a new, massive, fully-coupled radiation-hydrodynamics simulation of galaxy formation during the Epoch of Reionization, performed with RAMSES-CUDATON, as an update of Cosmic Dawn I (Ocvirk et al. 2016). To this end, I computed the amount of escaping ionising photons from the dark matter haloes during and before the EoR. I found that dark matter halos between 1e9 and 5e10 solar masses produce more than 80% of the ionising photons reaching the IGM between z=8 and z=6. Less massive haloes are too dim, whereas brighter haloes are too few, and dense and opaque in their cores to provide a more significant contribution. As redshift increases past z=8, this dominant mass interval moves to lower mass haloes.

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