The effect of supernova and AGN feedback on the escape of ionizing radiation from high-z galaxies

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Quantifying how much of the ionizing radiation produced by massive stars in high-redshift galaxies is able to escape in the IGM is one of the main challenges in understanding the sources of reionization. We investigate, and compare, the properties of the ionizing radiation escaping from simulated low mass galaxies, halos of a few $10^9 M_\odot$ at $z = 6$, where radiation is modelled explicitly and on-the-fly, and different sources of feedback, from stars and black holes, are included.

In Trebitsch et al. (2017), we found that stellar feedback plays a pivotal role in regulating the escape fraction in dwarf galaxies. More specifically, supernovae carve holes in the gas distribution, through which ionizing photons can escape. In the absence of supernovae, photons are absorbed very locally, within the birth clouds of massive stars.

We expand this work by including an extra source of feedback from a central black hole to investigate the potential effect of AGN feedback on the escape fraction in dwarf galaxies. This preliminary study tends to indicate that the production and escape of ionizing radiation in these galaxies is at least qualitatively unchanged by the presence of a central black hole. This is due to the fact that, in our simulated galaxy, the black hole does grow only very little, mostly because of the efficient supernova feedback that regulates the black hole growth in low-mass galaxies (see e.g. Dubois et al., 2015).

References

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