The impact of dust on the leakage of ionizing photons from galaxies

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If star-forming galaxies are to explain the reionization of the Universe at redshift z > 6, hydrogen-ionizing (Lyman continuum, LyC) radiation must be able to escape from these galaxies and into the intergalactic medium. Several detections of LyC leakage from galaxies have already been made both in the local Universe and at redshifts up to z ≈ 3—4, but the increasingly neutral intergalactic medium prevents direct observations of the LyC from galaxies at redshifts higher than this (Inoue et al. 2014, MNRAS 442, 1805). Indirect methods are therefore required to push LyC leakage studies into the actual reionization epoch. In a sequence of papers, we have developed methods of this type to constrain the LyC escape fraction from individual galaxies at z > 6 using emission-line diagnostics (e.g. Zackrisson et al. 2013, ApJ, 836, 79; Inoue et al. 2016, Science, 352, 1559; Jensen et al. 2016, ApJ, 827, 5; Zackrisson et al. 2017, ApJ, 837, 78). One potential problem with this approach is that the fraction of ionizing photons that are directly absorbed by dust within galaxies remains poorly constrained. Here, we combine far-UV, optical and far-IR data to make a first attempt to quantify this LyC extinction effect for a number of galaxies which exhibit LyC leakage in the local Universe, and discuss how such measurements can potentially be pushed to higher redshifts in the future.