Near-Field Cosmology with Low-Mass Galaxies: Constraining the Escape of Radiation from the UV-slopes of Local Galaxies ()

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Low-mass galaxies are thought to play a large role in reionizing the Universe at redshifts, z > 6. However, due to limited UV data on low-mass galaxies, the models used to estimate the escape of radiation are poorly constrained. Using theoretical models of radiation transport in dusty galaxies with clumpy gas media, we translate measurements of the UV slopes of a sample of low-mass low-z KISSR galaxies to their escape fraction values in Ly-alpha radiation, fesc (LyA), and in the Ly-continuum, fesc (LyC). These low-mass starforming systems have potentially steep UV slopes, and could provide a much-needed relation between easily measured spectral properties such as UV slope or LyA line properties, and the escape of LyA/LyC radiation. Such a relation could advance studies of primordial star clusters and the underlying physical conditions characterizing early galaxies, one of the target observation goals of the soon to-be-launched James Webb Space Telescope. This work was supported by the University of San Francisco Faculty Development Fund, and NSF grant AST-1637339. We thank the Aspen Center for Physics, where some of this work was conducted, and which is supported by National Science Foundation grant PHY-1607611.

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