Direct detection of the circumgalactic medium using Dragonfly

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Abstract

We describe a new approach to studying the intergalactic and circumgalactic medium in the local Universe: direct imaging. We have modified the Dragonfly Telephoto Array to turn it into an ultra-sensitive line emission mapper. This upgrade is designed to target the extremely low surface brightness visible-wavelength line emission from gas in the cosmic web. Using hydrodynamical cosmological simulations (EAGLE) we investigate the expected brightness of this emission at low redshift (z $<$ 0.2) and find that H-alpha emission in extended halos of galaxies (analogous to the extended Lyα halos/blobs detected around galaxies at high redshifts) and the fluorescent 'skin' of local 'dark' HI clouds could be directly imaged in exposure times of _˜10 hours. We will present first results from our prototype and speculate on the ultimate limits of an upgraded array.

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