

## Exploring the CRAG: The HI Covering Factor of the ALFALFA Galaxies ()

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We report the initial findings of our Survey of the Circumgalactic Regions of the ALFALFA Galaxies (CRAG). We combine the blindly detected 21-cm HI sources of the ALFALFA catalog with archival HST/COS G130M QSO spectroscopic observations taken from the HST Spectroscopic Legacy Archive to quantify and characterize the circumgalactic medium (CGM) around these local, HI-rich galaxies. We find the covering factor of HI, as probed by Ly $\alpha$ , to be near unity within 50 kpc of all ALFALFA galaxies, regardless of HI mass, MHI. However, we have identified a significant correlation between the extent of the HI-bearing CGM beyond 50 kpc and MHI of the ALFALFA galaxies. We find the galaxies with  $\log(\text{MHI}/M_{\odot}) > 9.5$  give rise to Ly $\alpha$  covering factors  $> 0.5$  out to 300 kpc, indicating the CGM of the most HI-rich galaxies of the ALFALFA sample fills a significant volume. At the same time we find the galaxies with  $\log(\text{MHI}/M_{\odot}) < 9.5$  give rise to substantively lower Ly $\alpha$  covering factors beyond 50 kpc. Most notably, the  $\log(\text{MHI}/M_{\odot}) < 7.5$  galaxies give rise to a Ly $\alpha$  covering factor  $< 0.3$  beyond 50 kpc and negligible covering factors beyond 150 kpc. This work has been supported by NSF grant AST-1716569.

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