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Cross-correlation between the CMB lensing potential measured by Planck and high-redshift Herschel-ATLAS galaxies

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We present the first measurement of the correlation between the map of the CMB lensing potential derived from the Planck mission data and high-redshift galaxies detected by the Herschel-ATLAS (H-ATLAS) survey. This galaxy catalogue is the highest redshift sample for which the correlation between Planck CMB lensing and tracers of large-scale structure has been investigated so far. We perform a number of null tests and reject the no CMB lensing-galaxy correlation hypothesis at a 20σ significance. The significance of the detection of the theoretically expected cross-correlation signal is found to be 10σ . The estimated galaxy bias, $b=2.8 \pm 0.1$, is consistent with earlier estimates of the bias for the H-ATLAS galaxies at similar redshift. On the other hand, the amplitude of the cross-correlation is found to be a factor 1.6 ± 0.2 higher than expected from the standard model and found by cross-correlation analyses with other tracers of the large-scale structure. We have investigated few possible reasons for the excess amplitude however any of them can not fully account for the enhanced cross-correlation signal.

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