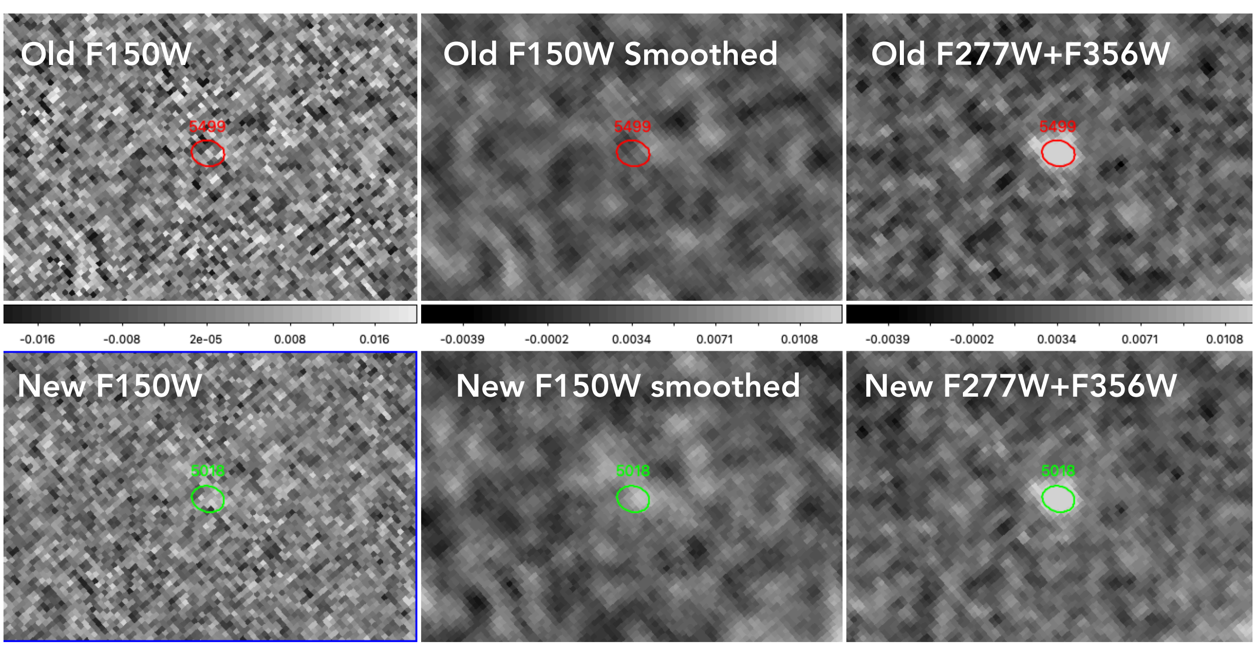
As the arXiv "comments" space is limited, we wanted to provide more detail here on the changes in the accepted version of https://arxiv.org/abs/2207.12474 from our originally-submitted version. Between paper submission and acceptance, there were two very important updates to the data.

The first is that STScI released in-flight photometric calibration, which we have now adopted. This has minimal impact on our result as the object photometric redshift is dominated by the observed Lyman-alpha break, but we have propagated these changes through.

The more major update is that we have significantly improved the astrometry in our reduced data. As described in our paper, we modified the pipeline to use the TweakReg code to iteratively improve the astrometry over what is available in the default pipeline products. We had discussed in the original paper this resulted in an rms of ~1 pixel (0.03"; significantly better than the default pipeline). Since that time, we have improved our methodology to fit every detector in every image independently, using more robust catalogs created via Source Extractor (which better centroids the sources used to register the images when compared to the previously used Photutils). This has significantly improved our astrometry, resulting in now negligible systematic offset when compared either to HST, or between NIRCam bands, and an astrometric rms uncertainty half of what it was originally (now typically ~15 mas between NIRCam and HST, and ~6-8 mas between NIRCam bands).

This improved astrometry results in a change to the short-wavelength photometry for our source. Specifically the improved alignment between the *individual* F150W exposures results in more positive flux in this filter near this galaxy's position, and the improved alignment between the NIRCam bands moves this flux closer to the center of our aperture (which is defined based on our long-wavelength detection image) in the final mosaic. The improved alignment also makes the F200W flux more centered in the aperture, making this band brighter than it had been (though ongoing efforts to improve the photometric calibration, especially in F200W, may bring this band's flux back down in the future). Our stringent non-detection in F115W remains unchanged.

The figure below shows the data at the time of submission in the top row, and our updated reduction in the bottom. It is apparent that in the original data, there was a small number of



positive pixels, which were just outside the aperture in the PSF-matched image (middle). The bottom row shows the improved mosaic, where the positive flux is now much more centered in the aperture. The right column shows our detection images, which defines the aperture.
The flux we detect in F150W is weak, and is consistent with the weak flux detected in the HST F160W image. In the original manuscript, the weak HST F160W was puzzling given the apparent F150W non-detection. We had discussed that this could be possible with a well-placed bright (EW > 300 A) emission line at z=12.8. However, all of the observations are now much more consistent with a Lyman-alpha break at z~12, which is at the very red edge of both F150W and F160W, thus the strong emission line isn't required. Importantly, like before the photometry still strongly disfavors any low-redshift solution.

We also note that the "potential" z ~ 12 sources discussed in the appendix are less likely to be robust. We find that they all had an increase in their SNR in F115W or F150W. Some still have best-fit photo-z's of z > 12, but their low-redshift solution is more prominent, thus they do not satisfy our stringent selection criteria. Therefore we have removed the appendix.

The main conclusions of the paper do not change — a bright z~12 galaxy is (nearly) as exciting and unexpected as a bright z~14 galaxy, though a spectroscopic confirmation is truly needed. The final photometric redshift is z=11.83_{-0.33)^{+0.18}.