## X29a JWST mid-infrared number counts and inferred cosmic star-formation history

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Source count — the number density of sources as a function of flux density — is one of the most fundamental statistics of imaging observations. One of the advantages is its simplicity, i.e., compared with more complicated and advanced analyses such as luminosity/mass functions, there is little room for analysis errors to distort results, yet the source counts still carry important information on galaxy evolution. We present these fundamental statistics for the newly advent James Webb Space Telescope (JWST) MIRI instrument in the six mid-infrared bands, i.e., 7.7, 10, 12.8, 15, 18 and 21 $\mu$m. The resulting IR populations of galaxy source counts are up to $\sim$100 times deeper than previous works, reflecting the superb sensitivity of the JWST.

Furthermore, we physically interpret these JWST number counts to constrain cosmic star-formation history (CSFH), and black hole accretion history (BHAH). Following Gruppioni et al. (2011), we parameterize IR luminosity functions (LFs) and their evolutions for five different populations of galaxies (star-forming galaxies, starbursts, composite, Seyfert 1 and 2). By simultaneously fitting the model to the six mid-infrared number counts, together with the previous results, we determine the best-fit evolutions of MIR LFs for each of the five types of galaxies, and thereby, CSFH and BHAH. The obtained CSFH and BHAH are consistent with the previous estimates, but thanks to JWST, our estimates are based on tens to hundreds of times fainter MIR sources, whose existence was merely an extrapolation in previous studies.