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JWST/MIRI Catches Many Obscured AGNs at High Redshifts

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Mid-infrared observations are potentially powerful in identifying heavily obscured AGNs which have weak emission in other wavelengths. MIRI onboard JWST offers an excellent chance to perform such studies. We take advantage of the MIRI imaging data from the CEERS survey to investigate the AGN population in the distant universe. We estimate the source properties of MIRI-selected objects utilizing spectral energy distribution (SED) modelling, and classify them into star-forming galaxy (SF), SF-AGN mixed object, and AGN. We derive the median SEDs for all three source types, respectively, and publicly release them. The median AGN SED is similar to the typical SEDs of Hot DOGs and Seyfert 2s, indicating that they are intrinsically the same type of objects, i.e., actively accreting but obscured supermassive black holes (BHs). Based on our SED-fit results, we estimate the BH accretion density (BHAD; i.e., total BH growth rate per comoving volume) as a function of redshift. The resulting BHAD agrees with the X-ray measurements at z < ~3, but becomes significantly higher than them toward higher redshift (~0.5-1 dex at z=4-5). This difference indicates MIRI is able to identify many heavily obscured AGNs in the early universe.

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