

标题: A COMPREHENSIVE VIEW OF A STRONGLY LENSED PLANCK-ASSOCIATED SUBMILLIMETER GALAXY

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摘要: We present high-resolution maps of stars, dust, and molecular gas in a strongly lensed submillimeter galaxy (SMG) at $z = 3.259$. HATLAS J114637.9-001132 is selected from the Herschel-Astrophysical Terahertz Large Area Survey (H-ATLAS) as a strong lens candidate mainly based on its unusually high 500 μm flux density (similar to 300 mJy). It is the only high-redshift Planck detection in the 130 deg² H-ATLAS Phase-I area. Keck Adaptive Optics images reveal a quadruply imaged galaxy in the K band while the Submillimeter Array and the Jansky Very Large Array show doubly imaged 880 μm and CO(1 \rightarrow 0) sources, indicating differentiated distributions of the various components in the galaxy. In the source plane, the stars reside in three major kpc-scale clumps extended over similar to 1.6 kpc, the dust in a compact (similar to 1 kpc) region similar to 3 kpc north of the stars, and the cold molecular gas in an extended (similar to 7 kpc) disk similar to 5 kpc northeast of the stars. The emissions from the stars, dust, and gas are magnified by similar to 17, similar to 8, and similar to 7 times, respectively, by four lensing galaxies at z similar to 1. Intrinsically, the lensed galaxy is a warm (T-dust similar to 40-65 K), hyperluminous (L-IR similar to 1.7×10^{13} L-circle dot; star formation rate (SFR) similar to 2000 M-circle dot similar to yr⁻¹), gas-rich (M-gas/M-baryon similar to 70%), young (M-stellar/SFR similar to 20 Myr), and short-lived (M-gas/SFR similar to 40 Myr) starburst. With physical properties similar to unlensed $z > 2$ SMGs, HATLAS J114637.9-001132 offers a detailed view of a typical SMG through a powerful cosmic microscope.

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