

X28a SOFIA View of an Extremely Luminous Infrared Galaxy: WISE 1013+6112

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We present far-infrared (FIR) properties of an extremely luminous IR galaxy (ELIRG) at $z_{\text{spec}} = 3.703$, WISE J101326.25+611220.1 (WISE1013+6112). This ELIRG is selected as an IR-bright dust-obscured galaxy (DOG) based on the photometry from the Sloan Digital Sky Survey (SDSS) and *Wide-field Infrared Survey Explorer (WISE)*. In order to derive its accurate IR luminosity, we perform follow-up observations at 89 and 154 μm using the High-resolution Airborne Wideband Camera-plus (HAWC+) on board the 2.7-m Stratospheric Observatory For Infrared Astronomy (SOFIA) telescope. We conduct spectral energy distribution (SED) fitting with the Code Investigating GALaxy Emission (CIGALE) using 15 photometric data (0.4–1300 μm). We successfully pin down FIR SED of WISE1013+6112 and its IR luminosity is estimated to be $L_{\text{IR}} = (1.62 \pm 0.08) \times 10^{14} L_{\odot}$, making it one of the most luminous IR galaxies in the universe. We find that dust temperature of WISE1013+6112 is $T_{\text{dust}} = 89 \pm 3$ K that is significantly higher than that of other populations such as SMGs and FIR-selected galaxies at similar IR luminosity. This indicates that WISE1013+6112 has a significant AGN and star-forming activity behind a large amount of dust (Toba et al. 2020, ApJ, 889, 76).