

Discovery of a lensed ultrabright submillimeter galaxy at $z=2.0439$.

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Abstract

We report an ultra-bright lensed submillimeter galaxy (SMG) at $z = 2.0439$, *WISE* J132934.18+224327.3, identified as a result of a full-sky cross-correlation of the *AllWISE* and *Planck* compact source catalogs aimed to search for bright analogs of the submillimeter galaxy SMMJ2135, the Cosmic Eyelash. Inspection of archival SCUBA-2 observations of the candidates revealed a source with fluxes ($S_{850\mu m} = 130$ mJy) consistent with the *Planck* measurements. The centroid of the SCUBA-2 source coincides within 1 arcsec with the position of the *AllWISE* mid-IR source, and, remarkably, with an arc shaped lensed galaxy in *HST* images at visible wavelengths. Low-resolution rest-frame UV-optical spectroscopy of this lensed galaxy obtained with 10.4 m GTC reveals the typical absorption lines of a starburst galaxy. Gemini-N near-IR spectroscopy provided a clear detection of H_α emission. The lensed source appears to be gravitationally magnified by a massive foreground galaxy cluster lens at $z = 0.44$, modeling with Lenstool indicates a lensing amplification factor of 11 ± 2 . We determine an intrinsic rest-frame 8-1000- μm luminosity, L_{IR} , of $(1.3 \pm 0.1) \times 10^{13} L_\odot$, and a likely star-formation rate (SFR) of $\sim 500 - 2000 M_\odot yr^{-1}$. The SED shows a remarkable similarity with the Cosmic Eyelash from optical-mid/IR to sub-millimeter/radio, albeit at higher fluxes. (See poster).