

**Understanding relationships between star formation rate, stellar mass  
and obscuration at high redshift with the SCUBA-2 Cosmology Legacy  
Survey**

Nathan Bourne<sup>1</sup>, Jim Dunlop<sup>1</sup>, and the S2CLS team

<sup>1</sup> *Institute for Astronomy, University of Edinburgh, the Royal Observatory, Blackford Hill,  
Edinburgh EH9 3HJ, UK*

**Abstract**

Our understanding of the history of star formation relies on accurately measuring the star formation rate (SFR) density from low to high redshifts, taking full account of the obscured ultraviolet (UV) light that is reprocessed by dust in the far-infrared (FIR). This is especially important at high redshifts where the obscuration of typical star-forming galaxies can become so great that the UV luminosity of a galaxy is poorly correlated with its total SFR. Yet we have a very limited understanding of obscuration in typical star-forming galaxies at high redshifts. Galaxy samples at  $z > 3$  become biased towards either FIR-bright or UV-bright tails of the population, as a result of the photometric selection techniques. We need to bring these two ends of the spectrum together if we are to characterise the relationship between stellar mass and SFR, and understand the evolution of the SFR density. Using the SCUBA-2 Cosmology Legacy Survey we tackle this problem by combining the deepest submm imaging with the latest techniques to break through the confusion limit, and measure the distribution of SFR and obscuration as a function of stellar mass and UV luminosity at high redshifts.