ABSTRACT

Title: "The redshifts, dust temperatures and luminosities of submm galaxies, and implications for the SIRTF galaxy population"

Author: Scott Chapman

Very luminous galaxies in the early Universe are largely hidden at optical wavelengths by shrouds of interstellar dust grains. However, they produce a significant fraction of the total cosmic energy emitted. These submillimeter (submm) galaxies were resolved from the background in 1997, but have been difficult to identify at other wavelengths of light due to the poor spatial resolution of submm instruments. This has impeded the determination of the redshifts to these submm galaxies, a crucial element to understanding their nature and evolution, and putting them in their correct cosmological context. We report spectroscopic redshifts for 60 submm galaxies (median z=2.4) where we have reliably identified the source of the submm emission using deep radio observations. We demonstrate that submm galaxies at $z > 2$ have a space density three orders of magnitude greater than that of similarly luminous galaxies in the present-day Universe, and that this population is responsible for a significant fraction of the total luminosity emitted by all high-redshift galaxies. Using the measured dust temperatures of submm galaxies, we predict that the overlap with the SIRTF population is expected to be small in all but the deepest SIRTF surveys (such as GOODS).