Far-UV to far-IR emission from Dusty SAGE: a galaxy evolution model with self-consistent dust treatment

Dian P. Triani[1,3], Darren J. Croton[2,3], Manodeep Sinha[2,3], Edward N. Taylor[2], Camilla Pacifici[5], Eli Dwek[4]

[1]Center for Astrophysics Harvard & Smithsonian, 60 Garden Street, Cambridge, MA 02138, USA, [2]Centre for Astrophysics & Supercomputing, Swinburne University of Technology, Hawthorn, VIC 3122, Australia, [3]ARC Centre of Excellence for All Sky Astrophysics in 3 Dimensions (ASTRO 3D),[4]Observational Cosmology Lab, NASA Goddard Space Flight Center, Code 665, Greenbelt, MD 20771, USA, [5]Space Telescope Science Institute, Baltimore, MD 21218, USA

We introduced a semi-analytic galaxy evolution model with a detailed dust prescription, Dusty SAGE. The model includes condensation of dust in the stellar ejecta, grain destruction by supernovae shocks, and removing dust from the interstellar medium by star formation, reheating and outflows. These dust- related processes are combined with the usual prescriptions in a galaxy evolution model, including gas infall, star formation, and feedback from supernova and active galactic nuclei. Here, we use dust and stellar properties from the model to generate the far-UV to far-IR emission self-consistently. The model reproduces the z=0 far-UV to far-IR luminosity functions from observation but is less successful at higher redshift. We found that the far-UV emission is sensitive to the dust processes and AGN feedback. Altering these parameters improves the agreement of the far-UV luminosity function at z=2 and z=3. However, further study of how these parameters behave during galaxy evolution is needed to consistently reproduce the far-UV to far-IR emission across a wide redshift range.