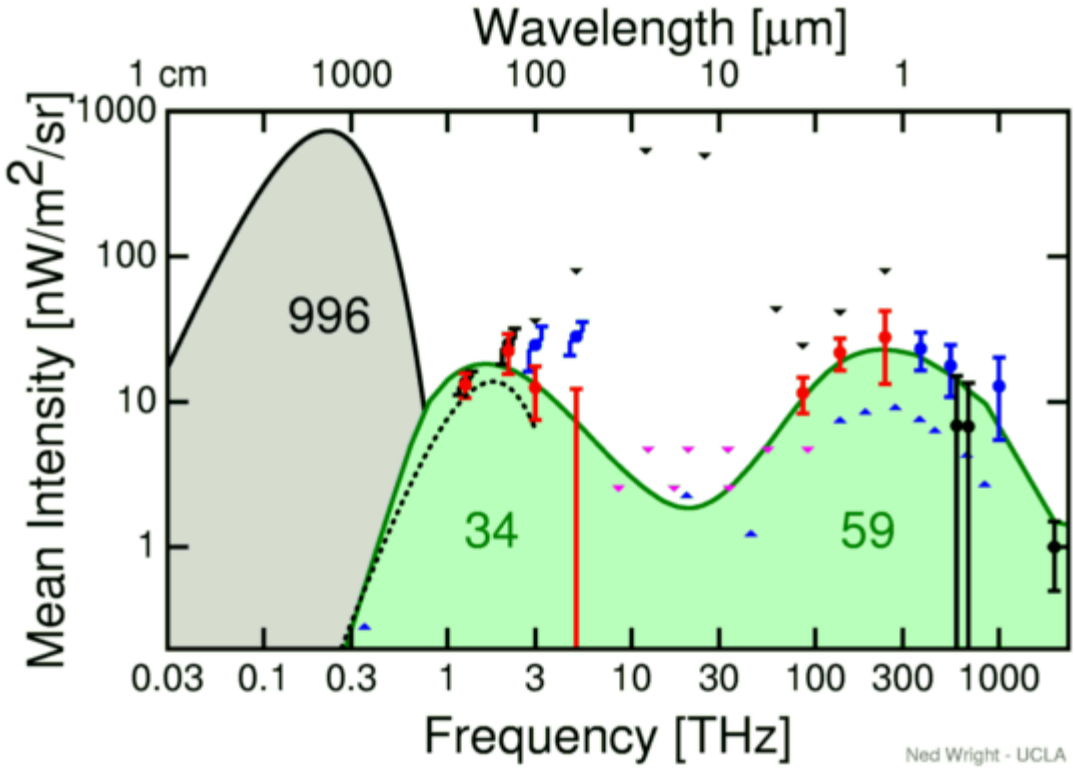
Cosmic InfraRed Background Radiation

The Cosmic InfraRed Background (CIRB) is the radiation from stars in many faint galaxies. It is what is left over after emission from our Solar System and our Galaxy has been subtracted away. Here are pictures of the sky before and after this foreground subtraction. The near-infrared (wavelengths near 2-3 microns) and optical (wavelengths near 500 nm) part of this extragalactic background light is just starlight redshifted into the infrared. But some starlight is absorbed by dust and re-emitted in the far-infrared (wavelengths near 100 microns). The figure below shows the cosmic near-infrared background in red in the center right, Rebecca Bernstein's optical cosmic background in blue on the far right, my recomputation of the far infrared background in red in the center left, the FDS 60 and 100 micron values in blue, the cosmic microwave background in gray on the far left.



The CMB is by far the largest of these radiation fields, with a total intensity of 996 nW/m^2/sr. The cosmic far-IR background, which was announced in January 1998, has a total intensity of 34 nW/m^2/sr, while the cosmic near-IR background found by Gorjian, Wright & Chary and Wright & Reese has a total intensity when combined with the optical background of slightly less than 60 nW/m^2/sr. Together these IR backgrounds add up to about 9% of the CMB's total intensity.

The black data points between 1 and 300 microns on this graph come from the DIRBE experiment on the COBE satellite. The red data points are my modified and new DIRBE results which use a different zodiacal light model than the one used by Hauser *et al.* (1998, ApJ, 508, 25). The blue lower limit symbols are based on integrating galaxy counts, while the purple upper limit symbols are based on limits on photon-photon collisions from gamma-ray astronomy. The black data points at wavelengths shorter than 1 microns come from
Dube, Wickes & Wilkinson (1979, ApJ, 232, 333),
Toller (1983, ApJL, 266, 79), and
Hurwitz, Martin & Bowyer (1991, ApJ, 372, 167).

The curve is the Lambda CDM model with the Salpeter IMF from Primack *et al.*, multiplied by a factor of 1.84, and with modifications for wavelengths longer than 300 microns to fit the FIRAS distortion limits, and for wavelengths shorter than 0.8 microns to fit the optical and UV data.

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