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Measurements of the spectral energy distribution of the cosmic infrared background

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The extragalactic background light (EBL) is the relic emission of all processes of structure formation in the Universe. About half of this background, called the Cosmic Infrared Background (CIB) is emitted in the 8–1000 microns range, and peaks around 150 microns. It is due to the dust reemission from star formation processes and AGN emission. The CIB SED constraints the model of star formation in the Universe. It is also useful to compute the opacity of the Universe to the TeV photons.

We present the different types of measurements of the CIB and will discuss their strengths and weaknesses.

1. The absolute SED was measured by COBE and more recently by Akari. These measurements are limited by the efficiency of the foreground subtraction.
2. Robust lower limits are determined from the extragalactic number counts of infrared galaxies. These lower limits are very stringent up to 100 microns. At larger wavelengths, the rather low angular resolution of the instruments limits strongly the depth of the counts. The “stacking” method determines the flux emitted at a given wavelength by a population detected at another wavelength, and provides stringent lower limits in the sub-mm range. It is complementary with other methods based on the statistical analysis of the map properties ($P(k), P(D)...$).
3. Finally, upper limits can be derived from the high energy spectra of extragalactic sources. These upper limits give good constraints in the near- and mid-IR.

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