Structure of the zodiacal emission by Spitzer archive data

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Dust in the interplanetary dust cloud not just reflects the sunlight (known as zodiacal light) but also has its own thermal emission. At the heliocentric distance of the Earth, the peak of this emission (with particle size $\sim$ 100 µm) is close to 20 µm. In this study, we used the data of four programs completed with the MIPS camera of the Spitzer Space Telescope at 24 µm to probe the large-scale brightness distribution as well as the small-scale (sub-arcmin) structure of the zodiacal cloud. The four programs were:

1. The Production of Zodiacal Dust by Asteroids and Comets (ID: 2317)
2. High Latitude Dust Bands in the Main Asteroid Belt: Fingerprints of Recent Breakup Events (ID: 20539)
3. A New Source of Interplanetary Dust: Type II Dust Trails (ID: 30545)
4. First Look Survey - Ecliptic Plane Component (ID: 98)

We take into account that, when the Spitzer Space Telescope carried out the measurements, it was orbiting the Sun at an Earth-trailing orbit and looking at different parts of the zodiacal cloud, in many cases looking through the same parts of the cloud from different locations. This gives us the chance to investigate the 3D distribution of zodiacal dust in addition to large- and small-scale structure of the cloud.

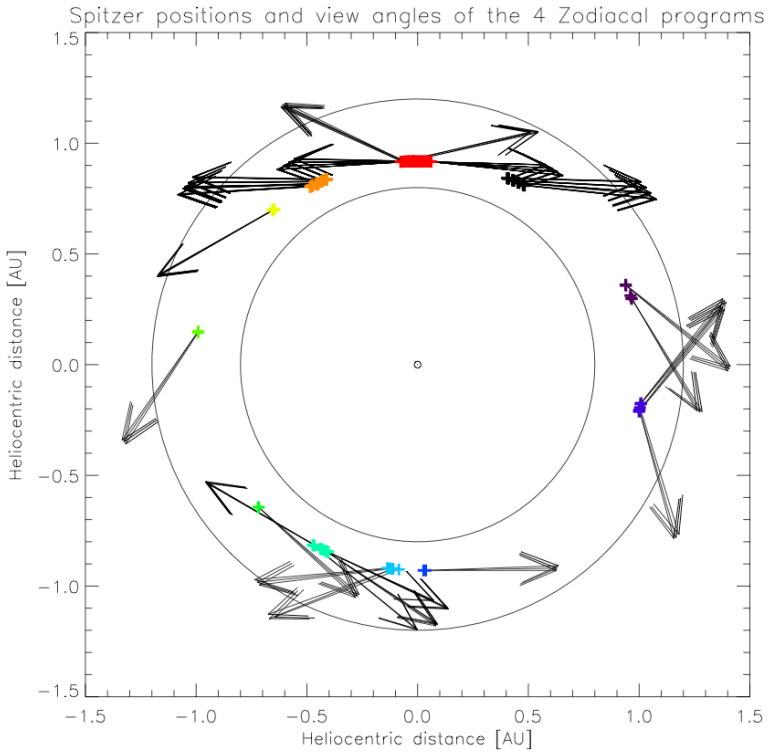

Figure: Positions and viewing angles of the Spitzer Telescope.