

Planck Results on Interstellar Dust

Jean-Philippe Bernard for the Planck collaboration (IRAP, 9 Av du Colonel Roche, 31028 Toulouse Cedex 4, France)

Observations of the dust emission in the Far-IR have made tremendous progress over the past years. Most recently, the advent of the Herschel Space Observatory and of the Planck satellite has fully opened the FIR-mm observation window.

I will review some of the recent Planck results related to the physics of large dust grains in our galaxy and the nearby Large and Small Magellanic Clouds. These results largely confirm those obtained earlier. In particular that the dust SED is flatter than expected and shows variations with wavelength and potentially with dust temperature, environment and metallicity. These results indicate that the FIR-submm emission of thermal dust is complex and variable. The possible reasons for that, such as the presence of very cold dust, spinning dust, the mechanical structure of dust grains, the aggregation of dust particles will be discussed.

I will also summarize the current findings of the Planck polarization data analysis. These include all sky polarization maps at wavelengths above 850 microns, dominated at the shortest wavelengths by polarized emission from thermal dust. These maps reveal the large-scale organization of the magnetic field as projected on the plane of the sky, which, even at the modest angular resolution of Planck ($5'$) can be followed down into the nearby star forming molecular structures. I will discuss future prospects for studying the impact of the magnetic field in regulating star formation using this data and ground follow-up surveys.

These themes are not only important to our understanding of dust properties in galaxies, but also to the removal of galactic foreground emission for CMB cosmology.