

Implications of the Pronaos observations for large scale surveys with FIRST

J.-Ph. Bernard, A. Abergel, F. Boulanger, J.-M. Lamarre, B. Stepnik
IAS, Bât 121, Université Paris XI, 91405 Orsay Cedex, France
Jean-Philippe.Bernard@ias.u-psud.fr

X. Dupac, M. Giard, I. Ristorcelli
CESR, 9 av. du colonel Roche, BP4346, F-31028 Toulouse cedex 4, France

We will present recent sub-millimeter (200-600 μm) observations obtained with the balloon-borne experiment Pronaos. These have led to exciting and sometimes unexpected new results regarding the nature, the composition and chemistry of dust grains in the ISM. In particular, they reveal dust significantly colder than expected ($T=12\text{ K}$) in translucent and optically thin dust clouds at high galactic latitude, which can be interpreted as evidence for the existence of fractal dust aggregates in diffuse clouds. The Pronaos observations also show a significant anti-correlation between dust equilibrium temperature and the spectral index of its emissivity law in the sub-millimeter. This may reflect quantum processes within the grains that appear only at low temperature and thus brings new insight on the nature of large dust grains in the ISM. Owing to the wavelength range covered and the high sensitivity achieved, the Pronaos observations prefigure what will be possible on large scale and higher angular resolution with FIRST. These results strongly argue in favor of a large survey of the diffuse ISM with FIRST and have direct implications about how to conduct such a survey.