**Mid-IR properties of normal spirals – questions for the Far-IR**

Marc Sauvage, Helene Roussel, Laurent Vigroux, Denis Reynaud
*msauvage@cea.fr*

We have assembled a sample of 70 spiral galaxies observed with ISOCAM at 7 and 15 microns, with the aim to investigate the links between the mid-IR emission, star-formation, morphological type, and bar type.
We show that global MIR disk fluxes are linearly correlated with Halpha, implying that in the disk, the MIR emission can be used as a reliable star formation tracer. We also show that the nuclear regions introduce a non-linearity to that relation, possibly due to a different mode of star formation (nuclear starburst) or to a higher extinction. We postulate that the well-known non-linearity of the FIR-Halpha correlation is also due to the contribution of the central regions, a fact that FIRST is well suited to investigate.
We show that the MIR-correlation breaks down when investigating individual regions inside galaxies, only to reappear when the scales considered reach 1-2 kpc. This indicates that ionizing and non-ionizing photons can have very different and very large mean free paths in the disk of galaxies. It also points to the difficulty of identifying the heating sources for the dust based simply on positional association between dust clouds and stars and favors a methodology where energy budgets are used.
Finally we investigate the impact of a bar on the mid-IR properties of spirals and show that this generally leads to a central starburst in early-type spirals only. This study shows that the state of star formation can be very different in the disk and in the central regions of spiral galaxies. Yet current instruments are not able to spatially resolve these two components in the FIR, resulting in much confusion in our understanding of the impact of star formation on the FIR emitting dust.