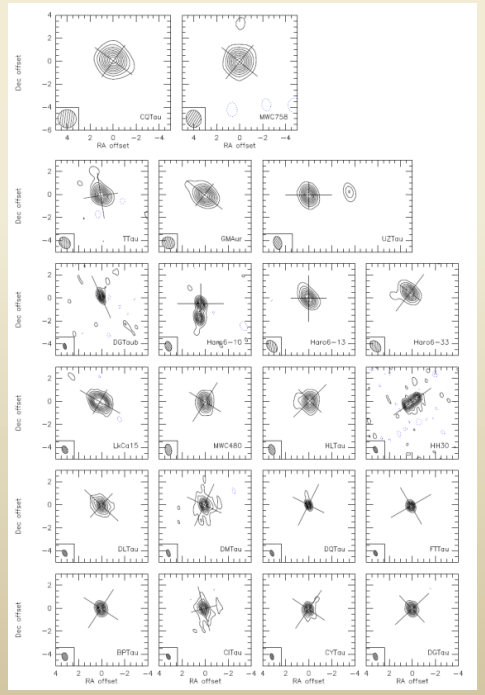
A dual-frequency sub-arcsecond study of proto-planetary discs: Constraints on dust evolution

Y.Boehler[1], S.Guilloteau[1], A.Dutrey[1], V.Piétu[2]

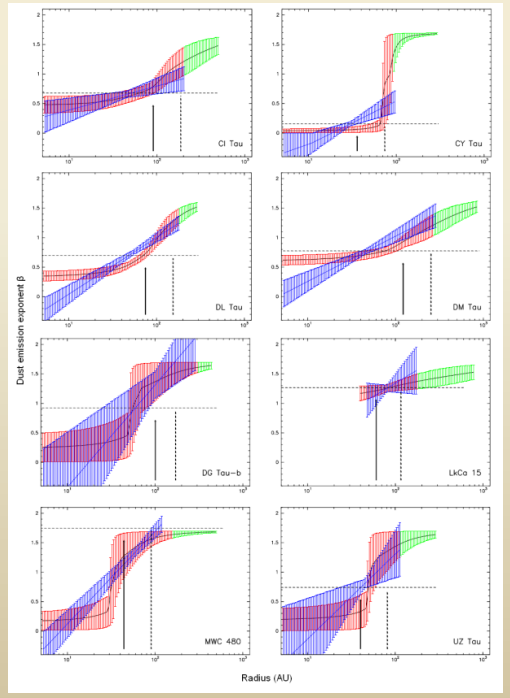
1: Laboratoire d'Astrophysique de Bordeaux, France (Yann.Boehler@obs.u-bordeaux1.fr)
2: IRAM, France

The planet formation is thought to take place in protoplanetary discs. Therefore, it is fundamental to know their dust and gas distribution as well as its evolution with time. For this, we attempt to characterize the radial distribution of dust in discs around a sample of 23 T Tauri stars in the Taurus-Aurigae region, including simple and multiple systems. These observations have been made using the IRAM PdB interferometer, with very high angular resolution (down to 0.4'' in some sources) at 1.3 mm and 3 mm. We find evidences for a radial dependence of dust properties.

Image of the continuum emission of the disks at 230 GHz.



Constraints on the variations of the dust emissivity index with the radius.



Some results:

- Direct evidence for tidal truncation is found in all multiple systems.
- Dust disks have a wide range of apparent sizes, from 20 AU to 600 AU. The characteristic size of the disk appears to increase continuously with age.
- We have strong evidence for a radial dependence of the dust emissivity exponent , which grows from 0 (big grains) at the center to about 2 (small grains as interstellar medium) at the disk edge.