Poster: Far-IR SED-Fitting and CO Abundances of Massive Molecular Clumps in the CHaMP Survey

- Rebecca Pitts

We used far-IR and sub-millimeter continuum data from the Herschel Space Observatory and the Atacama Pathfinder EXperiment (APEX) to fit pixel-by-pixel modified Planck SEDs to molecular clumps in the Census of High- And Medium-mass Stars (CHaMP) (280<l<300 deg, -4<b<2 deg). We present a selection of resolved maps of dust temperature and H2column density. We compare dust-derived H2column densities to CO column densities to derive maps of the CO abundance, and to H2column density derived from CO to chart the variation of the XCOfactor with column density. We find that CO abundance relative to H2varies by an order of magnitude or more across each region, dipping as low as$0.2\text{x}10^{-5}$CO per H2in the centers of the coldest (10-15 K) clumps, averaging a few times that, and peaking at or above the typical ISM value of 10^{-4} CO per H2near HII regions. This, plus the tension between dust- and CO-derived H2column densities demonstrates that no single CO abundance is appropriate to convert from CO column density to H2column density, even within the range of temperatures and H2column densities in a single molecular cloud. We also find that L/M depends almost exclusively on dust temperatureand is therefore not an independent measure of cloud evolution.Dust temperature incidentally correlates withH2column density to some power between $-1/(4+\beta)$ and 0,but with marked variability between clumps such thatnoonepower lawcandescribe the distribution in thetemperature-column densityplane.

Galactic Scale