# DISCS: A spatially and spectroscopically resolved survey of chemistry in protoplanetary disks

*Karin Öberg, Chunhua Qi, Jeffrey Fogel, Edwin Bergin, David Wilner, Ilaria Pascucci, Sean Andrews, Catherine Espaillat, Tim van Kempen*

Protoplanetary disks connect protostars and extra-solar systems chemically and physically, with implications for the composition of comets and planets both in our Solar System and in the increasing number of extrasolar systems. To address the chemical evolution of these disks, including their organic inventory, we are in the process of spatially resolving the abundances of eight key molecules and ions – CO, $HCO^+$, $DCO^+$, $N_2H^+$, HCN, DCN, CN, $H_2CO$ – in 14 protoplanetary disks using the Submillimeter Array (DISCS: the Disk Imaging Survey of Chemistry with the SMA, PI K. Öberg). The detection rates of minor species such as $H_2CO$ and $N_2H^+$ are surprisingly high allowing us to directly compare the response of the chemistry – for example ionization rates, deuteration, signposts of photon dominated chemistry and ice evaporation – to the physical processes active in disks. A range of physical disk environments is ensured by including star+disk systems that span stellar spectral types from M1 to A0, orders of magnitude different accretion luminosities and X-ray fluxes, and exhibit the full range of grain evolution parameters found in disks. By combining the known physical structures of the disks with our survey of simple chemical systems, we aim both toward characterizing the main drivers of disk chemistry in the bulk of disk material and providing constraints on the physical processes active during planet formation.