

# Colloquium

**SFB 956**

Conditions and Impact of Star Formation

**18 January 2021**

Monday 3:30 pm

**Physikalische Institute Köln**

**Video stream / Host: Arnaud Belloche**

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## The Chemistry of Planet Formation

Protoplanetary disks around young stars are the factories of planetary systems. These structures contain all the material - dust, gas, and ice - that will build planets and other bodies such as comets. Hence, understanding the physics and chemistry of disks provides much needed insight into the conditions under which planets form, and determining their molecular content reveals the raw ingredients of planetary atmospheres.

In this colloquium I will present early results from the first ALMA Large Program dedicated to the observation of molecular line emission from protoplanetary disks around nearby young stars at high angular resolution (0.1" - 0.3"), titled „Molecules with ALMA on Planet-Forming Scales“ or MAPS. I will present images that reveal intriguing sub-structure in emergent line emission from key organic molecules such as CO, C<sub>2</sub>H, HCN, and CH<sub>3</sub>CN. I will discuss the link between known dust substructure and the observed line emission, and will present results from quantitative analyses of source properties such as radial mass distribution, chemical structure, ionisation structure, and elemental composition of the gas. I will also discuss how observations in the gas-phase of large organic molecules provide insight into the composition of the icy-comet building reservoir around other stars. Finally I will discuss how early results from MAPS have provided the most detailed studies to date of the chemistry of planet formation.