Fresh sublimates detected in a disk in outburst

J.-E. Lee[1], S. Lee[1], G. Baek[1], Y. Aikawa[2], L. Cieza[3], S.-Y. Yoon[1], G. Herczeg[4], and D. Johnstone[5], S. Cassasus[6]

[1]*School of Space Research, Kyung Hee University, Korea*
[2]*Department of Astronomy, The University of Tokyo, Japan*
[3]*Facultad de Ingenier´ıa y Ciencias, N´ucleo de Astronom´ıa, Universidad Diego Portales,Chile*
[4]*Kavli Institute for Astronomy and Astrophysics, Peking University, China*
[5]*NRC Herzberg Astronomy and Astrophysics, Canada*
[6]*Departamento de Astronom´ıa, Universidad de Chile, Chile*

Ices in protoplanetary disks are of special interest, since they are reservoirs of volatiles that could be incorporated to planetesimals (cometesimals) and eventually be delivered to planets. Chemical composition of ices in disks is, however, not easy to observe.

We observed a disk around FU ori star V883 Ori using ALMA. Previous work [1] found that the water snow line is located at the radius of ~ 40 au; a warm region is extended compared with typical disks, since the disk is heated via the outburst accretion. The duration of the outburst (~10^2 years) in FU ors is much shorter than the chemical timescale of the gas-phase reactions (several 10^4 yrs). We thus expect to detect fresh sublimates, which could tell us the ice composition in the disk prior to outburst.

We detected various COM lines in the disk of V883 Ori. The high spatial resolution data shows that CH_3OH emission is bright and originates in the water sublimation front. It suggests that the COMs we detected are fresh sublimates.

References

[1] L. Cieza et al. 2016, Nature, 535, 258