Contribution ID: **42** Type: **Poster**

eDisk: A Compact but Structured Keplerian Disk and Large-scale Streamers in the Class I Protostellar System IRAS 04169+2702

We present high-resolution (0.05"; 8 au) dust continuum and molecular line observations toward the Class I protostellar system IRAS 04169+2702 in the Taurus B213 region (d = 156 pc), as part of the ALMA Large Program *Early Planet Formation in Embedded Disks (eDisk)*. The 1.3-mm dust continuum emission traces a circumstellar disk with a central depression toward the protostar. Our supplementary VLA observations of the same target reveal a single central peak dominated by the free-free emission, which coincides with the depression of the thermal emission. The mean spectral index of the thermal dust emission over the wavelength from 1.3 mm to 1.4 cm is approximately 2.8, suggestive of the presence of grains grown to millimeter or centimeter sizes in the disk. Velocity gradients along the disk major axis are seen in emission from ^{12}CO (2−1), ^{13}CO (2−1), and C^{18}O (2−1) molecular lines. The position-velocity diagrams of these lines unveil a Keplerian-rotating disk with a radius of 21 au around a 1.3-$M_\odot$ protostar, similar to our Solar System, as well as an infalling and rotating envelope with the angular momentum conserved. In addition to the compact disk, large-scale infalling spiral structures, streamers, are discovered in C^{18}O (2−1), SO (6_5−5_4), and H_2CO ($3_{0,3}$−$2_{0,2}$) as well as in the 1.3-mm continuum emission. Notably, in the region closer to the protostar, the spatial coincidence of C^{18}O and SO within the spirals may indicate the presence of a shock related to accretion through arms.

Primary author: Dr HAN, Ilseung (Institut de Ciències de l'Espai, CSIC)

Presenter: Dr HAN, Ilseung (Institut de Ciències de l'Espai, CSIC)

Session Classification: Session 1a