P129a   ALMA Dust Polarization Study toward Prestellar and Protostellar Sources in
Orion

Satoko Takahashi (NAOJ/JAO), Kaho Morii (Kyushu Univ.), Tomohiro Yoshida (Kyoto Univ.),
Masahiro Machida (Kyushu Univ.), Kohji Tomisaka (NAOJ), Paul T. P. Ho (ASIAA), Edward B.
Fomalont (NRAO/JAO), Josep-Miquel Girart (CSIC-IEEC), and Kouichiro Nakanishi (NAOJ)

With the ALMA sub-milliarcsec angular resolution ($\theta \sim 0''.1$), we have performed linear polarization observations in the 1.1 mm dust continuum emission toward two prestellar, three Class 0, and two Class I sources embedded within the Orion Molecular Cloud-3. We detected polarized emission toward four protostellar (Class 0 and I) sources, while no polarized emission was detected toward two prestellar and one Class 0 sources due to the observational sensitivity limit. All the sources detected in the polarized emission show organized polarization E-vectors. Three of them (i.e., one Class 0 and two Class I sources) show 100 AU scale elongated disk-like structures with the polarization E-vectors aligned in their minor axes. Measured polarization fraction for all the three sources are within a few percent. Origin of the polarized emission could be explained by the self-scattering mechanism, or alternatively toroidal wrapping of the magnetic field lines. Our sample also includes variety of sources such as a Class 0 source showing complex field structures with a significantly high polarization percentages ($\gtrsim 10$ %), and a Class I protobinary system. In this talk, we will present observational results from individual sources, discuss origin of their polarized emission, and finally make comparisons among all the sample to see the correlation between the core evolution and dust polarization properties.