

Contribution ID: 138

Type: **Oral**

CO Polarization from GK Effect: 3D Magnetic Field in Orion KL

Magnetic field plays a crucial role in the evolution of the ISM and star formation process. Traditionally, we study the magnetic field through dust polarization, which is limited to tracing the magnetic field morphology in the plane of the sky. The Goldreich-Kylafis effect (G-K effect) provides a possibility to study the magnetic field through molecular line polarization, probing the magnetic field variation along the velocity axis. Thus, we can use molecular line polarization to map the magnetic field morphology at different depths. This study analyzes the ALMA CO (3-2) and 1.3 mm continuum polarized emission in Orion KL, a region characterized by an unusual explosion of unknown origin. Our findings reveal potential shock fronts along the CO out-flow fingers. Interestingly, the CO polarization fraction is significantly higher than predicted by our models, likely due to missing flux in the observations. Furthermore, statistical comparisons between CO and dust polarization angles suggest that the two may trace different layers. By combining CO and 1.3 mm continuum polarization data, we provide the first possible reconstruction of the 3D magnetic field morphology near the explosion center.

Section

Star Formation

Primary author: LIN, Shang-Jing (NTHU IoA)

Co-authors: YEN, Hsi-Wei (ASIAA); LAI, Shih-Ping (Institute of Astronomy, National Tsing Hua University)

Presenter: LIN, Shang-Jing (NTHU IoA)

Session Classification: Plenary session