

Title: Formation of Stellar Multiples in Magnetized Environments

Summary

It is remarkable that, despite their ubiquity, we still know little about how binary and multiple stellar systems form. This project aims to uncover the physical mechanisms driving their formation, including the elusive role of the magnetic field. A unique aspect of this project is the innovative use of ALMA observations at high-resolution in combination with polarization observations of the same large sample. Current knowledge of the formation of multiple systems is largely based on nearby regions forming only low-mass stars, which do not represent typical galactic environments. To overcome this bias, we have surveyed approximately 70 fields simultaneously forming both low- and high-mass stars. With these ALMA observations achieving ~ 50 au resolution, we expect to detect more than 1,500 young stellar objects (YSOs) and identify about 200 multiple systems, enabling a robust statistical analysis. Using the polarization observations, we aim to assess the importance of the magnetic field in the formation of the multiple systems.

The Project Assistant Professor will join the Radio Astronomy Group at the Department of Astronomy, The University of Tokyo, and contribute to various aspects of the project, including data reduction, studies of kinematics and dynamics, disks, streamers, magnetic fields, chemistry, and mentoring of students.