

Magnetic field structures in star-forming regions revealed by imaging polarimetry at multi-wavelengths

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Abstract. Magnetic fields are ubiquitous in various scales of astronomical objects, and they are considered as playing significant roles from star to galaxy formations. However, the role of the magnetic fields in star forming regions is less well understood because conventional optical polarimetry is hampered by heavy extinction by dust. We have been conducting extensive near-infrared polarization survey of various star-forming regions from low- and intermediate-mass to high-mass star-forming regions, using IRSF/SIRPOL in South Africa. Not only linear but also circular polarizations have been measured for more than a dozen of regions. Both linear and circular polarimetric observations at near-infrared wavelengths are useful tools to study the magnetic fields in star forming regions, although infrared circular polarimetry has been less explored so far. In this presentation, we summarize our results of the near-infrared polarization survey of star forming regions and its comparison with recent submillimeter polarimetry results. Such multi-wavelength approaches can be extended to the polarimetry using ALMA, SPICA in future, and others. We also present our recent results of the first near-infrared imaging polarimetry of young stellar objects in the Circinus molecular cloud, which has been less studied but a very intriguing cluster containing numerous signs of active low-mass star formation.

References

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