

Wide-field Infrared Polarimetry of the Ophiuchi Cloud Core

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We have conducted wide and deep near-infrared imaging polarimetry of the ρ Ophiuchi cloud complex [1]. Aperture polarimetry in the JHK_S band was conducted for 2136 sources in all three bands, of which 322 sources have significant polarizations in all the JHK_S bands and have been used for a discussion of the core magnetic fields in the ρ Ophiuchi cloud complex. There is a positive correlation between degrees of polarization and $H - K_S$ color up to $H - K_S \approx 3.5$. The magnetic field structures in the core region are revealed up to at least $A_V \approx 47$ mag and are unambiguously defined in each sub-region (core) of Oph-A, Oph-B, Oph-C, Oph-E, Oph-F, and Oph-AC. Their directions, degrees of polarization, and polarization efficiencies differ but

their changes are gradual. Therefore, the magnetic fields seem to be connected from core to core, rather than as a simple overlap of the different cloud core components. Comparing our results with the large-scale field structures obtained from previous optical polarimetric studies [2], we suggest that the magnetic field structures in the core were distorted by the cluster formation in this region, which may have been induced by shock compression due to wind/radiation from the Scorpius–Centaurus association.

References

- [1] Kwon, J., et al.: 2015, *ApJS*, **220**, 17.
- [2] Vrba, J., et al.: 1976, *AJ*, **81**, 958.

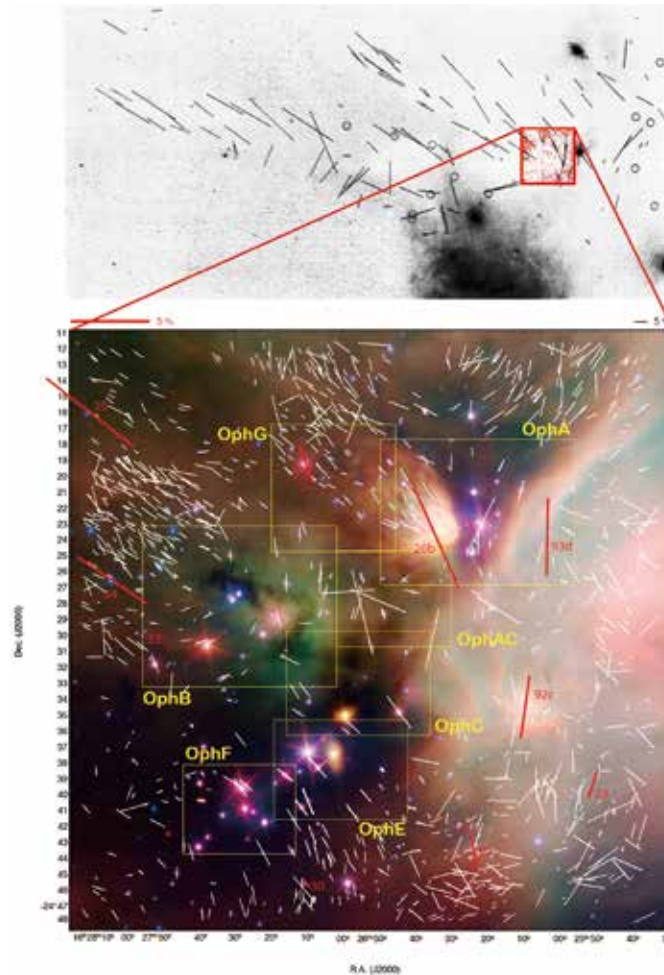


Figure 1: Comparison between infrared and optical polarimetry [1].