

Intermediate Galactic Latitude Starforming Region-CG 12

G. Maheswar*, P. Manoj and H. C. Bhatt
Indian Institute of Astrophysics, Bangalore 560034

Abstract. Optical linear polarization measurements of stars seen projected towards CG 12, an intermediate latitude ($b = 21^\circ.1$) starforming cloud, have been made. The results show that the polarization vectors of the majority of the stars seem to be oriented parallel to the tail of CG 12, implying that the magnetic field in the cloud is parallel to the tail. Spectroscopic observations of each component of the double star Her 4636 show that only the northern component has $H\alpha$ in emission.

1. Introduction

The Cometary Globule-CG 12, at a relatively large galactic latitude ($l = 316^\circ.5$, $b = 21^\circ.1$), has been proposed as a region of low-intermediate mass starformation (van Till et al. 1975). The globule has an opaque optical head of diameter $\approx 10'$ and a nebular tail extending more than 1° in length and directed towards galactic plane. The reflection nebula NGC 5367 lies in the head region of CG 12 surrounding the double star Her 4636. The two stars have been tentatively identified as mid-to-late B-type stars (van Till et al. 1975, Williams et al. 1977). We present here the preliminary results of polarimetric observations of stars seen projected towards CG 12 to find out the magnetic field geometry, and CCD spectra of both the components of Her 4636 to study the nature of the stars.

Optical linear polarization measurements were made with a fast star and sky chopping polarimeter coupled at the $f/13$ Cassegrain focus of the 1.02 m telescope at VBO, Kavalur and optical CCD spectra were obtained using the OMR spectrograph at the 2.3 m VBT with a dispersion of $2.5 \text{ \AA pixel}^{-1}$.

*e-mail:maheswar@iiap.ernet.in

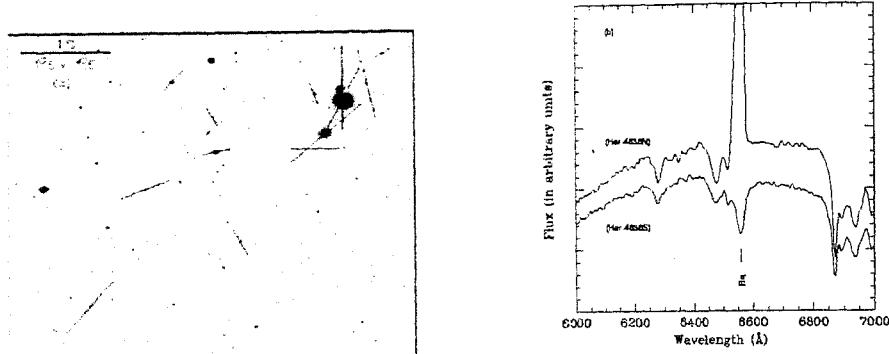


Figure 1. (a) Polarization vectors of stars seen projected towards CG 12 overlaid on DSS image (b) Spectra of northern (Her 4636N) and southern component (Her 4636S).

2. Results and Discussion

The observed polarization of stars towards CG 12 (Fig.1a) ranges from $\sim 0.10\%$ to $\sim 1.42\%$. Stars which are seen projected inside the cloud boundaries show relatively higher values of polarization. Position angles of a majority of stars towards the direction of CG 12 (including Her 4636) are found to be nearly parallel to the tail as well as the CO outflow direction (White, 1993). If the polarization is due to dust grains aligned by the magnetic field in the cloud, then the polarization vectors are parallel to the field. The position angle of the outflow direction is $\sim 148^\circ$ and polarization position angle of Her 4636 is found to be 157° . This is consistent with the current theories of starformation which suggest the formation of flattened circumstellar structure perpendicular to the magnetic field and molecular outflows channelled along the field. Polarization measurements of stars towards CG 12 have been used to map the geometry of the magnetic field in the cloud. The magnetic field in the cloud is found to be oriented nearly parallel to the cometary tail as well as the CO outflow direction. It is suggested that the cometary morphology depends on the cloud magnetic field.

The spectra of both the components of visual binary Her 4636 are shown in Fig.1b. The spectrum of the northern component Her 4636N has H α in emission indicating it to be relatively more active, perhaps due to continuing accretion, than the southern component Her 4636S.

References

- van Hill, H., Loren, R., Davis, J., 1989, *ApJ*, **198**, 235.
 Williams, P.M., Brand, P.W.J.L., Longmore, A.J., Hawarden, T.G., 1977 *MNRAS*, **180**, 709.
 White, G.J., 1993 *A&A*, **274**, L33