POLARIZATION MAPPING OF INFRARED REFLECTION NEBULAE

T. Nagata, T. Yamashita, S. Sato, M. Tanaka
Dept. of Physics, Kyoto U., Kyoto 606, Japan
S. Suzuki, N. Kaifu
Nobeyama Radio Obs., U. of Tokyo, Nagano 384-13, Japan
I. McLean
The Royal Obs. Edinburgh, Edinburgh EH9 3HJ, UK
J. Hough
Hatfield Polytechnic Obs., Hertfordshire, SG13 8LD, UK
I. Gatley
UKIRT, Hilo, Hawaii 96720, USA
R. Garden
The Royal Obs. Edinburgh, Edinburgh EH9 3HJ, UK

Extensive reflection nebulae have been discovered around GGD27 IRS and around W75N IRS by mapping the infrared polarization in the K band.

It was found that the infrared radiation from both objects is extended at λ = 2.2 μm, by using the Agematsu 1-m, the UH 2.2-m, and the UKIR 3.8-m telescopes. We have carried out polarization mapping with the Kyoto polarimeter on the UKIRT in August 1985.

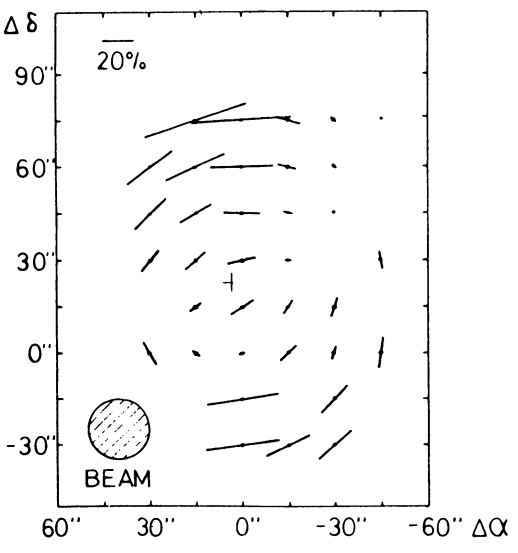

Fig. 1. K band polarization map around GGD 27 IRS.

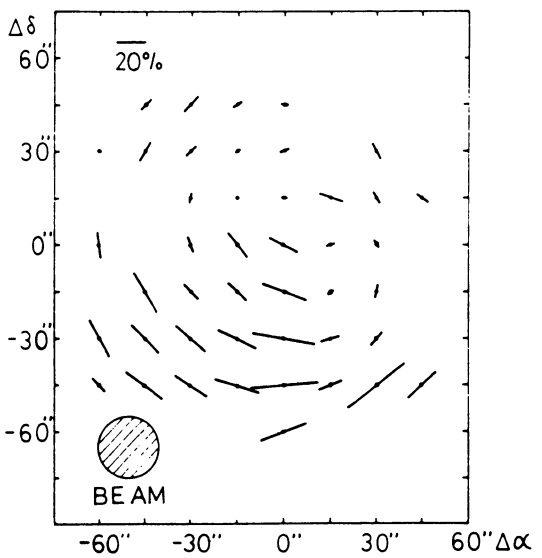

Fig. 2. Same for W75N IRS.

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They are new examples of infrared reflection nebulae like those found in Orion KL, Cep A, and S106. The polarization vectors show concentric patterns and the degree of the K band polarization exceeds 50% at some positions in the outer regions; scattering would be the mechanism of the polarization. The polarized flux was detected over the area of $\sim$ 1 arcmin from the central peaks with a limiting magnitude of $\sim$ 19 mag/square arcsec. At least some of the protostellar objects seem to have a stage in which they have such extensive reflection nebulae.

INTERACTION OF PROTOSTELLAR WINDS WITH THE ORION MOLECULAR CLOUD

Tōru Okuda
Institute of Earth Sciences, Hakodate College, Hokkaido University of Education, Hakodate, Japan

ABSTRACT. The effect of a strong protostellar wind on a dense molecular cloud with a magnetic field is investigated by time-dependent magnetohydrodynamic calculations which take into account the cooling due to H_2 molecules as the dominant one. The shocked region obtained here seems to be responsible for the formation of the bright H_2 emission with a high-velocity width observed in the Orion-KL Nebula.

1. ASSUMPTIONS AND METHOD

It is assumed that the mass loss rate of the wind from an inner boundary $r = r_*(0.003$ pc) increases linearly with time until it attains a given mass loss rate and that thereafter both the mass loss rate $\dot{M}$ and the wind velocity u_* are constant there. The ambient molecular gas is initially assumed to exist wholly as H_2 molecules and to be at rest with uniform density n_0. We consider that only H_2 molecules are the dominant coolant, based on the analysis of the dissociation and radiative cooling by H_2 molecules developed by Lepp and Shull (1983). We consider the case where there is a uniform magnetic field in the ambient gas. The magnetic field has a component in the ϕ direction of spherical polars only, that is, $B = (0,0,B_0)$.

With spherical symmetry, the flow equations described by Lagrangian coordinates are numerically integrated by the implicit difference method. Table I shows the adopted model parameters which corresponds to those inferred for the bipolar source, Orion-KL (Chernoff *et al.* 1982).

2. RESULTS

The computations were continued until the outward facing shock arrives

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