

POLARIZATION MEASURES OF STAR No. 1
IN NGC 2024*John S. Hall* and Braulio Iriarte*

SUMARIO

La estrella No. 1 en NGC 2024 fue medida para polarización. Los resultados muestran un valor extraordinariamente alto, de 0^m22 en el plano de vibración situado en 136° . La polarización encontrada en el amarillo (0^m22) es un poco más alta que la encontrada en el azul (0^m18). Sin embargo, hay que tomar en consideración que sólo fue posible hacer una comparación.

Estos resultados ponen en evidencia, una vez más, que los valores altos de polarización en el Agregado de Orión de alguna manera están íntimamente relacionados con las regiones nebulares, en las que las estrellas están sumergidas.

ABSTRACT

Polarization measures made of Star No. 1 in NGC 2024 have revealed an extremely high value of 0^m22 with the plane of vibration situated at 136° . Polarization found in the yellow (0^m22) was somewhat larger than found in the blue (0^m18). Only one comparison, however, was made.

This result provides further evidence that high polarization in the Orion Aggregate is in some way closely associated with nebulous regions in which the stars are embedded.

The unusual reddening of Star No. 1 in NGC 2024, found by H. L. Johnson and Eugenio E. Mendoza, induced Haro to suggest that it might also exhibit excessively large interstellar polarization.

Photoelectric observations were made on two nights with the 40-inch reflector at Tonantzintla. The observations on the first night showed a polarization of about 0^m20 . These first observations indicated that the measures might be influenced by two special circumstances. The star is embedded in nebulosity which might contribute to the light of the star and to the measured polarization. Secondly, the star is situated $13''$ from a companion about 2^m5 fainter. A number of tests indicated, however, that the light from this companion could be effectively screened out in the focal plane of the telescope.

The "bright" or nebulous sky was compared with the dark sky eight minutes of arc away. The nebulous sky was measured, using a $25''$ diaphragm, in an area centered $26''$ from star No. 1 in a direction opposite to that of its companion.

The measures were made with a d. c. polarimeter having Polaroid as the analyzer. The B and V filters of the UBV system were used. The photomultiplier was an S-11 EMI 6256S. The results are as follows:

Polarization data for Star No. 1 in NGC 2024:

A. No filter

1) Compared to Nebular sky
 $P = 0^m23$, $\Theta = 138^\circ$

2) Compared to dark sky
 $P = 0^m20$, $\Theta = 137^\circ$

B. Yellow (V) filter. Nebular sky
 $P = 0^m22$, $\Theta = 134^\circ$

C. Blue (B) filter. Nebular sky
 $P = 0^m18$, $\Theta = 136^\circ$

The largest interstellar polarization previously reported which has come to our attention is the value 0^m22 found by W. A. Hiltner (1956 a) for star No. 12 in VI Cygnus. He also found that the total absorption (visual) was greater than 10 magnitudes (1956 b). This is somewhat larger than the value of 9^m6 given by Johnson and Mendoza in the present issue of this bulletin.

Unfortunately, further observations could not be made in the Orion area during this observing season. The data indicate that the polarization of this star is not greatly inferior to that found for star No. 12 in VI Cygnus by Hiltner. It is not yet advisable to conclude on the basis of these data alone that the polarization in yellow light exceeds that found in the blue.

* Lowell Observatory.

The average position angle of 136° for the plane of vibration is only 7° larger than that found by Hall (1958) for HD 37903, which is half a degree away and shows a polarization of 0^m027 . The position angle of 136° does not bear any close relationship to the orientation of the observed nebulosity.

This region of Orion is 15° from the galactic plane, the polarization of only 10 of 60 stars measured in the Orion Aggregate, Hall (1958), shows polarization greater than 0^m02 . It is apparent from a study of the distribution of the polarization found for stars in Orion (see Plate VI, 1958) that polarization is most pronounced for those objects associated with strong nebulosity. Other stars show little or no polarization. An exception to this is HD 38051; its polarization, however, is only 0^m033 .

This suggests that the space between us and Orion is relatively free of polarizing clouds and that the observed polarization is probably produced within the nebulous area closely associated with the stars themselves.

REFERENCES

- Hiltner, W. A., 1956 a, *A. J.*, **61**, 45.
1956 b, *A. J.*, **61**, 358.
Hall, John S., 1958, Publ. U. S. Naval Obs. XVII. pt. VI, 335.