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MIRA'S LINEAR POLARIZATION NEAR THE 1980 LIGHT MAXIMUM

Four wide-band (B-filter) linear polarization measurements of Mira (\circ Ceti) were carried out over a one week interval which commenced about six weeks after the 1980 light maximum. (Janet A. Mattei of the A.A.V.S.O. kindly provided a provisional estimate of the occurrence of Mira's light maximum.) Polarization measurements were carried out at the Cassegrain focus of the 61-cm telescope at Columbia University's Harriman Observatory. A description of the polarimeter and observing procedures, as well as evidence for instrumental accuracy and precision, have been given by Hayes (1980). The observations are listed in Table I, with the amount (P) and direction (θ) of polarization being expressed

Table I

Journal of Mira's Polarization Degree and Position Angle

Date (UT)	P (%)	θ (deg.)
1980 Oct. 31.16	0.87	40.0
1980 Nov. 02.18	0.83	38.6
1980 Nov. 03.12	0.83	40.0
1980 Nov. 06.16	0.82	40.0

in percentages and equatorial coordinates, respectively. All observations have a Poisson photon count standard deviation of 0.02% for P, while the standard deviation of θ is given by $28.7 (\sigma_p/P)$.

Perhaps the most important datum of this report are the position angles. Serkowski (1971) noted that θ appeared to alternate between high and low values for one cycle of Mira's maximum to the next, with variations of $20^\circ - 40^\circ$ being generally found in the earlier data [vide Shawl (1975)]. Such variations resemble those found in the RV Tauri star U Mon, which Serkowski (1970) has attributed to nonspherical pulsation modes. But the position angles obtained near the 1977 maximum (McLean and Coyne, 1978) differed markedly from the earlier results. Tomaszewski *et al.* (1980) reported that the position angles around the 1978 maximum were also discrepant, but to a lesser extent. The polarization amounts and positions being reported here bear resemblance to some of the earlier results reported by Shawl (1975). The 1980 polarization observations in concert with results derived by other techniques may permit a resolution of the roles played by nonspherical pulsations and alternative mechanisms such as grain growth in the extended atmosphere, and the waxing and waning of large scale convective cells in the lower atmosphere of this star.

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