Source A —12.0 and —8.4 } km/s
Source B — 9.5 and —6.2 }

At 1667 MHz:

Source A —10.6 } km/s
Source B (—13.0) and —9.3 }

The median velocities differ by approximately 2 km/s, which is possibly an indication of some motion such as rotation of the dust lane region.

Circular polarization patterns in Source A were 82% RHC for the —12 km/s component and 55% LHC for the —8.4 km/s component. For Source B the senses of circular polarization are opposite, although the degrees of polarization are considerably less. The presence of a longitudinal component of magnetic field is suggested by the polarization results, but a high value of 10^{-3} gauss would be required if the presence of two-velocity components were attributed to Zeeman splitting.

In Source A the intensity OH-emission line was greater at 1665 than at 1667 MHz; in Source B the 1667 MHz line was far more intense.

Linear polarization measurements were made in Source A; an upper limit of 10% is estimated.

Two absorption features at —4.5 and +5.5 km/s reached maximum values at the maximum of the continuum radiation. The values agree, within experimental error, with absorption features in neutral hydrogen found by Clark *et al.* (1962) and support the earlier statement that some OH gas exists in HI clouds.

Gardner, F. F., McGee, R. X., and Robinson, B. J., 1967.—Submitted to *Aust. J. Phys.*
Clark, B. G., Radhakrishnan, V., and Wilson, R. W., 1962.—*Ap. J.* **135**, 151-174.

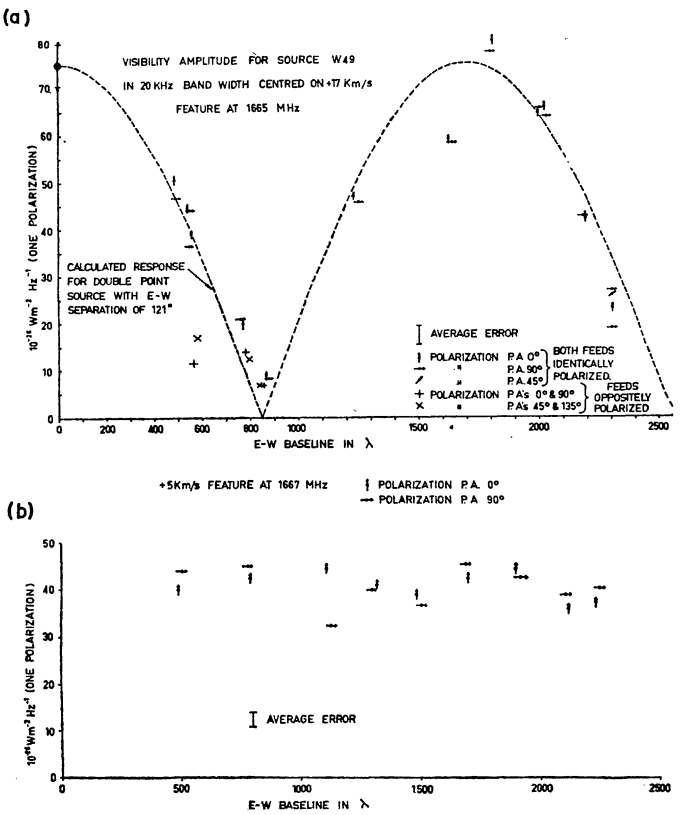

Figure 1. Visibility amplitudes for (a) the 1665 MHz (+17 km/s) feature, and (b) the 1667 MHz (+5 km/s) feature in the OH emission spectrum of W49.

Interferometric Observations of the OH Emission from W49

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The high intensity anomalous OH emission which has been detected in the neighbourhood of HII regions exhibits remarkable polarization characteristics, narrow spectral features, and unusual ratios of line strengths.[1,2,3,4,5,6] All of these unusual properties are generally believed to be attributable to maser action of some form. A knowledge of the structure of the emitting regions and their brightness temperature is necessary for the development of a satisfactory theory of the emission mechanism.

An attempt has been made with the Parkes interferometer to resolve the strong OH emission source in W49. In previous interferometric investigations[7,8] of this object the Caltech group found evidence for a double source at 1665 MHz (+17 km/s) with a separation of 100″ but no clear resolution effects at 1667 MHz (+5 km/s). The MIT group also found two unresolved sources 120″ apart with a complicated distribution of polarization and velocities in their emission.

The present measurements were made on September 1 and 2, 1966, and were restricted to these features in the spectrum of W49. The signals from the 210 ft. reflector and the movable 60 ft. reflector on an E-W track were combined in a frequency comparison receiver which rejected the continuum emission from the HII regions and accepted the line emission only. The bandwidth of 20 kHz used here is large compared to the fine structure in intensity and polarization found by other observers in these features, and the conclusions drawn from the present observations have significance therefore only as averages over this bandwidth. The visibility curves obtained are shown in Figures 1*a* and 1*b*. The flux values are based on an assumed value of 27.5 flux units for the calibration source 21-64 at this frequency. Figure 1*a* refers to the +17 km/s feature at 1665 MHz. The low minimum at 850λ and the high maximum at 1700λ suggest a double source with equal components. From the two sets of measurements made with parallel feeds we get an E-W separation of 121″ ± 4″. The remarkable similarity of visibility amplitudes at P.A. 0° and 90° indicates that there is negligible linear polarization except perhaps at exactly 45° or 135°. The 2300λ value with both feeds at P.A. 45° is some evidence against this possibility.

Measurements with "oppositely polarized" feeds at baselines between 1000λ and 2500λ had unfortunately to be discarded owing to dial calibration errors which resulted in the feed angles being incorrectly set. However, from the few good measurements near the first minimum at 850λ we can conclude that both the sense and degree of circular polarization of the two sources are nearly identical. Unequal percentages would have produced a less well-defined minimum and opposite senses of circular polarization would have produced a maximum rather than a minimum.

The upper limit to the size of the individual sources is approximately 15″, and as there are two sources this corresponds to a lower limit of 2×10^5°K for their brightness