LETTERS TO THE EDITOR

RADIOASTRONOMY

Polarization of 16-Mc/s Radiation from Jupiter

It has recently been reported by Dowden[1] that, for 10·1-Mc/s radiation from Jupiter, the relative proportion of bursts of opposite sense of polarization appears to vary with the Jovian System III central meridian longitude (λ_{III}). Bursts recorded when λ_{III} was close to 240° (International Astronomical Union revised System III) were found to be almost exclusively elliptically polarized in the right-handed sense whereas bursts recorded when λ_{III} was close to 55° were as much as 83 per cent left-handed. The purpose of this communication is to report that a similar tendency was noted at 16 Mc/s for a few events recorded at the Florida State University Radio Observatory in 1962.

A series of polarization observations has recently been commenced at 16, 18, 22 and 26 Mc/s using azimuthally mounted crossed five-element Yagi aerials. Some of the equipment was installed during 1962 and various preliminary observations were undertaken at that time, consistent with the availability and development of the complete system. From June 7 until August 27 polarization observations were made at 16 Mc/s using the simple two-receiver and hybrid circuit arrangement previously described elsewhere[2]. During this period 15 events were recorded, identification being by the aural monitoring technique. Interference can be troublesome at this frequency, but eight of the events were good enough, with respect to intensity, duration and reception conditions, to be roughly equivalent to the Class I and II events specified by Douglas and Smith[3]. Of these eight events, seven occurred during periods when λ_{III} was somewhere within the range $215° \leqslant \lambda_{III} \leqslant 280°$; the noise bursts in these events were 99 per cent right-handed. The other event occurred when $116° \leqslant \lambda_{III} \leqslant 134°$; the noise bursts in this event were 42 per cent left-handed.

A detailed study of polarization is now in progress and the results of this will be reported in due course.

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[1] Dowden, R. L., *Austral. J. Phys.*, **16**, 398 (1963).
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Absorption of Radio Radiation in *M* 82 and Other Galaxies

The galaxy *M* 82 (*NGC* 3034) has recently been examined by many observers using different techniques, and some of the peculiarities of this object have now been explained. Here we shall try to answer one of the remaining questions, namely, why the radial velocity of this galaxy as determined from 21-cm line measures does not agree with the optically derived velocity.

Optical spectra have been obtained at several observatories. Radial velocities have been published by Humason, Mayall and Sandage[1] (Table 1). The rotation of the galaxy around an axis perpendicular to the major axis has also been investigated by Mayall[2].

Table 1. Radial Velocity of *M* 82 relative to the Sun

Method	Velocity (km/sec)	Ref.
Optical spectra	263 ± 75	1 (Table 1)
Optical spectra	275	1 (Table 5), 2
21-cm line profile	185 ± 5	3
Same corr. for abs.	250 ± 25	This communication

A 21-cm line investigation of *M* 82 was carried out by Louise Volders and J. A. Högbom[3]. They derived the line profile shown in Fig. 1*a*, where each point represents the average of 6 h observations. From this profile they derived the radial velocity of the centre of gravity of *M* 82, 190 km/sec relative to the local standard of rest. This velocity corresponds to the maximum intensity of the observed radiation. The whole profile is not symmetrical around this velocity, however. The authors point out that this asymmetry may not be significant, because of the great uncertainty in the intensity values near zero velocity, where radiation from nearby gas in the Milky Way tends to confuse the picture. They make the interesting remark, however, that the line profile covers the same velocity range as the optical measurements by Mayall (+100 to +400 km/sec), although the velocities of the centre seem to differ greatly. They suggest the explanation that the centre of rotation is displaced about 1 min of arc towards south-west from the apparent centre of the optically observed body, so that the optically determined velocity contains a rotational component.

After the publication of the paper by Volders and Högbom, it has been shown by C. R. Lynds[4] that *M* 82 also contains a source of continuous radio radiation. This source has since been examined by several investigators, especially in wave-lengths near 21 cm[7-9]. Some radio data are collected in Table 2. Three facts should be stressed here. (1) The radiation in the continuum around 21 cm is stronger than in 'normal' galaxies. (2) The corresponding source is concentrated to a small region near the centre[8]. (3) The R.A. of the high-frequency radio source differs from the R.A. of the low-frequency radio source by more than the estimated errors. These data now lead me to suggest the following picture.

The radio source observed in the continuum around 21 cm and at shorter wave-lengths is approximately coexistent with intense *H* II regions in or near the nucleus of the galaxy. This source will influence both the 21-cm line profile and the continuum observations at longer wave-lengths. In both cases we must consider the possible absorption of part of the radio radiation. The absorption will, however, take place in different ways in the two cases.

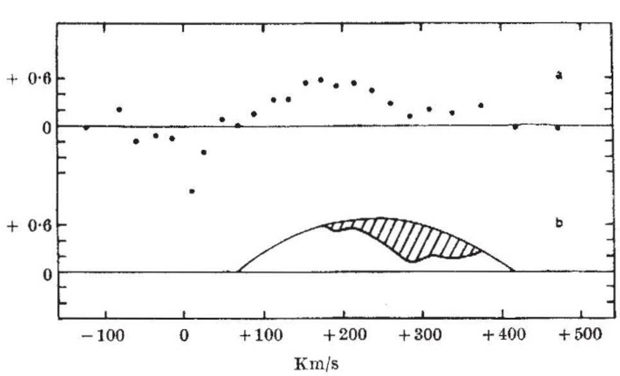

Fig. 1. 21-cm line profile for *M* 82. (*a*) Profile observed by Volders and Högbom[3]. Each point represents the average of 6 h observations; (*b*) same profile with correction for absorption