electrons—one group with pitch angles distributed nearly isotropically ($q \lesssim 2$) and the other with very flat pitches ($q \gtrsim 20$).[3]

*Energy.* The direction of polarization of Jupiter's decimeter radiation is observed to be orthogonal to the projection of the magnetic axis on the plane of the sky; but for $\nu \gtrsim 100\ \nu_{\max}$, our model demands (table 4; also Thorne [1963]) that the radiation be polarized parallel to the magnetic axis. Consequently, we can be certain that $\nu_{\text{decimeter}} \lesssim 100\ \nu_{\max}$, or, equivalently, that the high-energy cutoff in the electron energy distribution satisfies

$$[(E_2)_{\text{MeV}}]^2 \times (B_0)_{\text{gauss}} \gtrsim 200. \tag{13}$$

The more stringent bound, $\nu_{\text{decimeter}} < \nu_{\max}$ ($E_2^2 B_0 \gtrsim 2 \times 10^4$), seems quite likely, since the spectrum could be flat over a section of the region $\nu > \nu_{\max}$ only if $\gamma < 1$; and $\gamma < 1$ seems unlikely on physical grounds.

Although we are fairly certain that $\nu_{\text{decimeter}} < \nu_{\max}$, we cannot be sure that $\nu_{\min} < \nu_{\text{decimeter}}$ ($[E_{1\text{MeV}}]^2 B_{0_{\text{gauss}}} < 2$). Table 3 reveals that the beaming and polarization of the radiation in the region $\nu < \nu_{\min}$ is not too different from that for the region $\nu_{\min} < \nu < \nu_{\max}$. However, the spectrum is quite different in these regions. If $\nu_{\text{decimeter}} < \nu_{\min}$, then the energy exponent, $\gamma$, must exceed 1 in order for the decimeter spectrum to be flat. In fact, $\gamma$ might be as large as 5 (the value for the Earth's Van Allen belt—[cf O'Brien et al., 1962]—if $\nu_{\min}$ were sufficiently large. Such a situation cannot be ruled out.

[3] In a private communication Roberts and Komesaroff note that the particular 2-component pitch angle distribution given in their paper [Roberts and Komesaroff, 1965] to fit the 21 cm data is not correct; but that the necessity for two components, one with $q \lesssim 2$ and the other with $q \gtrsim 20$, is unavoidable.

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# Observations of Jupiter at 8.6 mm

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Attempts to obtain measurements of the brightness temperature of Jupiter at 8.6 mm were made on several occasions near the opposition in May, 1959. With the 10-ft reflector the expected antenna temperature was low, and it was necessary to average repeated drift scans to obtain a measurable deflection. Atmospheric fluctuations nullified the results on some occasions, but analytical criteria found effective in more recent work have enabled the measurements for three days to be evaluated with some confidence. These results were

| | |
|---|---|
| 1–2 May, 1959 | 308 ± 88 °K (p.e.) |
| 6–7 May | 291 ± 88 °K |
| 8–9 June | 260 ± 90 °K |

These values, obtained with north-south polarization, exceed the expected temperature by roughly a factor of two, and seem to indicate an anomalous effect in this period. The stated uncertainties were derived from the random fluctuations in the drift scans, with a relatively small systematic error not included. However, it should be emphasized that some chance exists that these results are in large error. For example, on another day, June 10, data considered to be comparable in quality yielded a blurred unmeasurable result. Therefore, further observations at various periods would be useful.

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