

POLARIZATION OF BURSTS OF SOLAR RADIO EMISSION AT MICROWAVE FREQUENCIES

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The intensity and polarization of solar radio bursts at 9400, 3750, 2000, and 1000 Mc/s have been continuously observed since 1957 July. At 3750 Mc/s, the linearly polarized components were also measured during 4 months from 1957 October till 1958 January [1]. The analysis of observations to 1958 May reveals the following points:

1. Many bursts at these frequencies show a difference in the intensity of two circularly polarized components. Frequency distributions of maximum degree of polarization of bursts are shown in Fig. 1, where weak bursts are excluded to reduce errors. At 3750, 2000, and 1000 Mc/s, particularly at 3750 Mc/s, the bursts of small degree of polarization are predominant. Circularly polarized bursts are occasionally observed at 2000 and 1000 Mc/s, but at higher frequencies the degree of polarization is usually less than 50 per cent.

2. At 3750 Mc/s, no linearly polarized components could be detected in 117 bursts for a bandwidth of 10 Mc/s. The burst at this frequency is usually composed of a small degree of circularly polarized component and a randomly polarized one.

3. Sometimes the sense of polarization varies with frequency. An example is shown in Fig. 2. On this occasion, the degree of polarization is small at 3750 Mc/s and the sense of polarization reverses between 2000 and 3750 Mc/s. Roughly grouped in Table I are 129 bursts simultaneously observed at four frequencies. The reversal of sense was found in 64 per cent of such bursts. Sometimes the sense of polarization varies with time, as may be found in our monthly report. Some of such phenomena may be interpreted by the motion of the source from the preceding part of a bipolar spot group to the following one or vice versa [4].

4. In Fig. 3, the bursts associated with flares are classified in three types

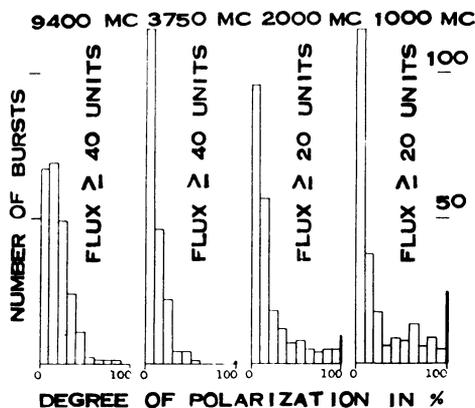


FIG. 1. Histograms showing the frequency distribution of maximum degree of polarization of bursts.

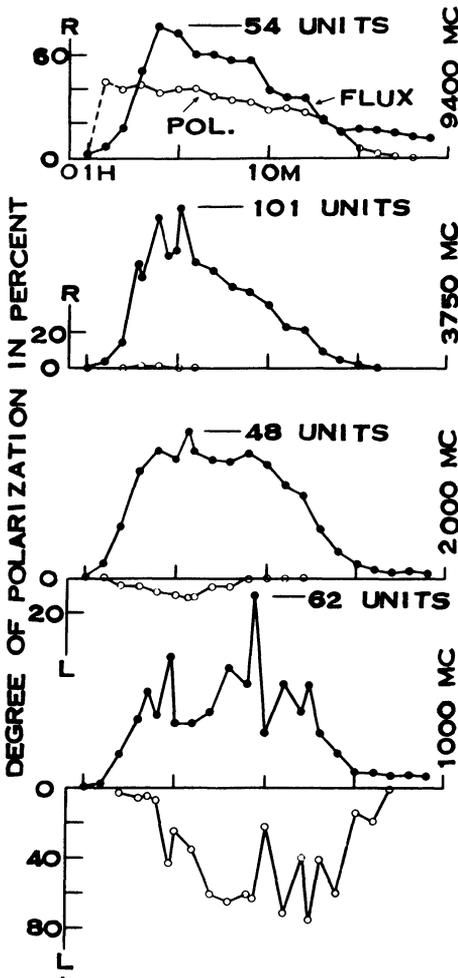


FIG. 2. Intensity and polarization of the burst observed on 1957 July 15.

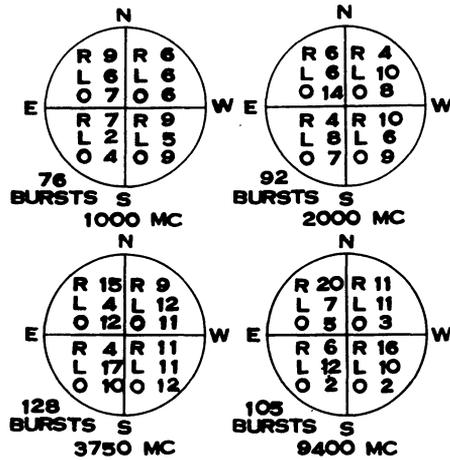


FIG. 3. Relation between position and number of bursts for each polarization.

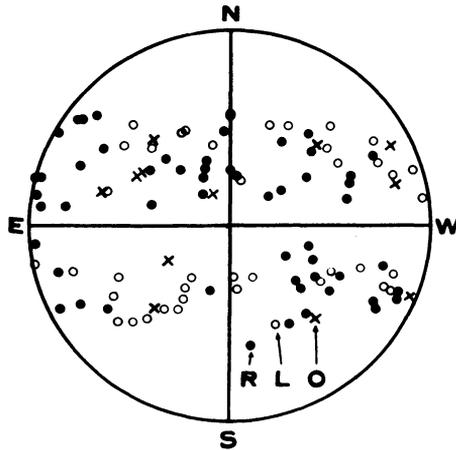


FIG. 4. Relation between position and polarization of bursts at 9400 Mc/s.

TABLE I

CLASSIFICATION OF BURSTS

The sense reverses	$\left. \begin{array}{l} \text{between 9400 and 3750 Mc/s} \dots\dots\dots 18 \\ \text{between 3750 and 2000 Mc/s} \dots\dots\dots 40 \\ \text{between 2000 and 1000 Mc/s} \dots\dots\dots 13 \\ \text{twice between 9400 and 1000 Mc/s} \dots\dots\dots 12 \end{array} \right\}$	83		
		The sense is the same at all frequencies	13	13
		Degree of polarization is nearly zero, etc.	33	33

