

2.9 FARADAY ROTATION OF THE CRAB PULSAR RADIATION

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During April, 1970, the 300-ft telescope of the National Radio Astronomy Observatory was used to determine the mean polarisation of the Crab Nebula pulsar radiation at several frequencies around 400 MHz. The position angle of the highly polarised precursor measured at each frequency, corrected for ionospheric Faraday rotation and plotted against inverse frequency squared is shown in Figure 1. The observed variation of the position angle with frequency is consistent with Faraday rotation of the plane of polarisation with a rotation measure of -40.5 ± 4.5 rad/m². This value is of the same sign but larger than the rotation measure for the nebular radiation in the vicinity of the pulsar.

The intrinsic angle (position angle at infinite frequency) of the radio radiation is an important quantity, particularly since polarised optical pulses are observed from this pulsar. Unfortunately, the present accuracy of the rotation measure determination is insufficient to fix this angle, the formal value being $90^\circ \pm 140^\circ$. However even when an improved value for the intrinsic angle is obtained, comparison of the radio and optical results will not be straightforward as pulse shapes and polarisation characteristics are different for the radio and optical pulses.

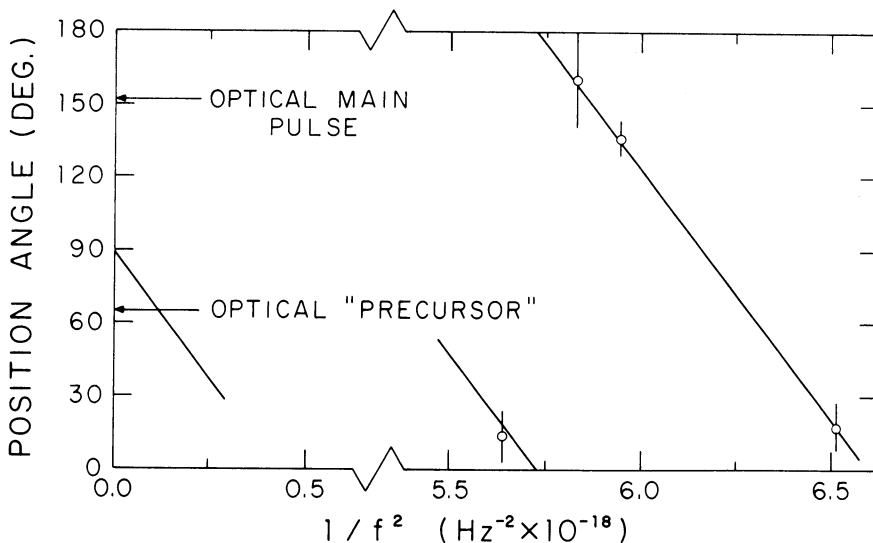


Fig. 1. Position angle of the Crab pulsar precursor measured at four frequencies between 392 MHz and 421 MHz plotted against inverse frequency squared. A line corresponding to a rotation measure of -40.5 is drawn through the points. The position angle of the pulsed optical radiation at the peak of the main pulse and at pulse phase corresponding to the radio precursor are indicated.

* Operated by Associated Universities, Inc., under contract with the National Science Foundation.