common axis of the majority of small scale structures not only within this part of the Mozambique Belt but also within the cataclastically and plastically deformed margin of the granitoid Shield. This precludes the possibility that the east-south-east plunging structures belong to a pre-Mozambiquian east-south-east trending orogeny. These structures are mainly expressed on a mesoscopic scale, but some can be recognized photogeologically.

Folding on north-north-east axes overturned to the west occurs in comparatively small areas near to the orogenic front. This may be later than the structures trending east-south-east.

There are noteworthy resemblances between the relationships which we have observed in Tanzania and those described by Sanders[12] in western Kenya at the junction of the Mozambique Belt and its foreland.

Photogeological interpretation of the selected areas and extrapolation of the results with the intention of constructing a tectonic map of the boundary region is continuing. We hope to be able to show the variations along, and to draw tectonic sections across, a larger section of an orogenic front than has previously been possible.

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ASTRONOMY

Possible Circular Polarization of Compact Quasars

WE wish to point out in this communication that both the radio and optical radiation from compact quasars may be circularly polarized. We consider here the situations in which this polarization is most likely to be detectable, and discuss the theoretical implications if it should be found.

The synchrotron radiation from a system of relativistic electrons moving in a uniform magnetic field of strength H gauss, with an isotropic distribution of pitch angles, will be circularly polarized by $\sim 100 \left(\frac{\nu_L}{\nu}\right)^{\frac{1}{2}}$ per cent[1,2], ν_L being the electron gyrofrequency ($\sim 3\ H$ Mc/s): the precise value depends on the electron energy spectrum and on the observer's orientation relative to the field. Non-uniformities and self-absorption in the source would naturally diminish the observed degree of circular polarization.

In a typical radio galaxy with $H \sim 10^{-5}$ gauss, we would expect an unobservably small amount of circular polarization—$\lesssim 0{\cdot}1$ per cent at ~ 100 Mc/s, and even less at higher frequencies. The percentage of polarization may, however, be much larger for compact quasars, the magnetic field of which (at least within the variable component) may be as great as between 1 and 100 gauss[3,4] ($\nu_L \sim$ 3–300 Mc/s). The radiation from these objects at, say, $\sim$3,000 Mc/s could thus, in principle, be 3–30 per cent circularly polarized. The observed net polarization would, however, be reduced for three reasons. (*a*) The magnetic field in the compact component might be non-uniform. (*b*) Synchrotron self-absorption would destroy circular polarization within the compact component if the optical depth were large. (*c*) A contribution to the flux might come from a non-varying "halo" with a weaker magnetic field.

As regards (*a*), we note that the variable radio flux from 3*C* 273 is linearly polarized[5], so that the magnetic field in that case is probably fairly uniform. Moreover, the absence of linear polarization in other compact sources may be due to differential Faraday rotation, which would not affect circular polarization. To minimize the effects of self-absorption we suggest exploiting the proposal of several authors[6–9] that the variable flux comes from a component which is expanding. If this idea is correct, the maximum flux is attained just when the expanding component starts to become transparent at the frequency of observation. Thus the consequences of (*b*) and (*c*) would simultaneously be minimized if observations were made at, or soon after, the time when the flux reaches a peak.

We conclude that the existence of at least about 1 per cent circular polarization in the radio emission from compact quasars is by no means unlikely. The chances of detecting it would be greatest if observations were made at a frequency where large amplitude intensity variations are known to occur (which restricts us to frequencies $\gtrsim$ 1,000 Mc/s), at a time when the flux is just starting to decrease. If circular polarization were indeed observed it would provide evidence for the operation of the synchrotron process, and enable us to estimate the magnetic field strength directly. We would not, however, expect the observed degree of circular polarization to be exactly proportional to $\nu^{-\frac{1}{2}}$ for the compact component would not contribute the same fraction of the total flux at different frequencies. Plasma radiation might also be circularly polarized in the presence of a magnetic field, but only in a narrow range of frequencies[10].

We note finally that the optical continuum would not be circularly polarized if it is the result of synchrotron emission (unless the velocity distribution of the electrons had a very unlikely and anisotropic form). There is the alternative possibility, however, that the optical continuum results from inverse Compton scattering of radio synchrotron radiation[3,4,11], which may, as we have seen, possess significant circular polarization. Because inverse Compton scattering preserves polarization[12,13], the optical continuum could then be circularly polarized by about 1 per cent. If the light from quasars were found to exhibit detectable circular polarization, this would therefore indicate that it arose from the inverse Compton process, and not from synchrotron emission.

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