Microwave Observations of Mode Coupling in Solar Active Regions

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We present a study of the electromagnetic mode coupling observed in coronal loops at 17 GHz. We follow the development of a group of active regions for a period of 10 days during April, 1993. The observed sense of polarization changes with the active region location on the solar disk.

This change of polarization can be explained by the mode coupling theory which states that a weak coupling of the ordinary and extraordinary electromagnetic modes in a plasma with strong transversal (to the propagation direction) magnetic field can produce a polarization reversal.

The mode coupling depends on the physical parameters (and their gradients) of the quasi-transverse magnetic field region. Therefore, the study of this process, can be used to obtain the physical parameters such as the magnetic field and its gradient, in the solar corona. In particular, in this work, we present a detailed study of the magnetic field gradient obtained from the mode coupling observation.