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THE NEXT PLAN OF THE NOBEYAMA RADIOHELIOGRAPH

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INTRODUCTION

A high time- and spatial-resolution radio interferometer for solar observations has been constructed at Nobeyama (Figure I. ; Nakajima et al. 1994). The Nobeyama Radioheliograph consists of 84 antennas, 0.8m in diameter, arranged on a T-shape lines of 500m in the EW and 220m in the NS directions. The time resolution is 50 ms and the spatial resolution is 10". The field of view is 40' at the observing frequency 17GHz, which enables us to watch the whole sun. The radioheliograph has observed hundreds of flares during the few months since the beginning of regular observations in July '92, and such powerful performance has never before been demonstrated in the history of solar radio observations.

FIGURE I Nobeyama Radioheliograph.

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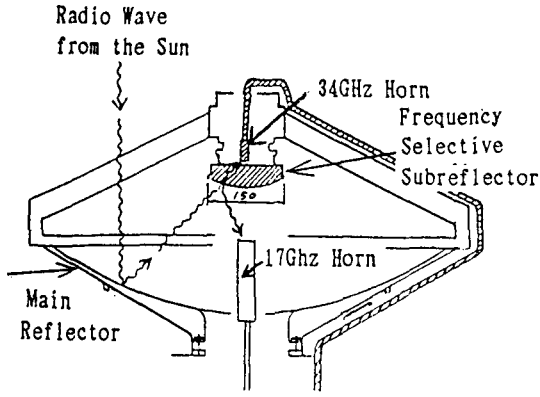

FIGURE II A schematic diagram of the dual-frequency receiving antenna.

To improve the radioheliograph, we plan simultaneous observations at 34GHz and 17GHz to determine radio spectra of solar flares.

DUAL-FREQUENCY RECEIVING ANTENNAS

We have developed a prototype dual-frequency receiving antenna using frequency selective subreflectors (hereafter FSS's). FSS's are made of fine ceramics on which gold Jerusalem-cross patterns are printed (Irimajiri et al., 1991). Radio waves from the sun at 34GHz are reflected on the main reflector, pass through the FSS, and are fed into a horn settled at the prime focus of the main reflector as shown in Figure II. Waves at 17GHz are reflected on the FSS and introduced into the horn at the Cassegrain focus. Degradation of antenna gains with the FSS compared with a usual metal subreflector was measured to be less than 0.2dB at 17GHz and 0.5dB at 34GHz. Cross-polarization characteristics were less than about -20dB in the main beam area.

SCHEDULE

The dual-frequency system can be realized within a few years for the Nobeyama Radioheliograph by replacing metal subreflectors into FSS's and installing frontend receivers for 34GHz still during the active period of this solar cycle.

REFERENCES

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