

MAXIMUM AND MINIMUM GALACTIC BACKGROUND RADIATION AT 45 MHz

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RESUMEN. La radiación galáctica máxima y mínima se ha medido en 45 MHz con la formación de 528 dipolos del Radio Observatorio de Maipú. Temperaturas de antena de 89000 K y 3050 K se han obtenido para el máximo y mínimo respectivamente.

ABSTRACT. The maximum and the minimum of the galactic background radiation have been measured at 45 MHz with a 528 dipole array at the Maipú Radio Astronomy Observatory. Antenna temperatures of 89000 K and 3050 K have been obtained for the maximum and the minimum respectively.

I. INTRODUCTION

It is known that the galactic background radio radiation is an important tool to study the magnetic field, the physical nature and the morphology of the Galaxy. Although several surveys of the galactic radio-frequency background have been made over the last 30 years, many of the most fundamental characteristics of the observed radiation remain subjects of uncertainty and debate (Brown 1974). This fact is specially relevant in the Southern Hemisphere where regions as important as the galactic center, the south galactic pole and the galactic radiation minimum are located, and few works of this nature has been carried out.

A 45 MHz survey of the Southern sky was started at the Maipú Radio Astronomy Observatory of the University of Chile. The preliminary results have been published elsewhere (Bitrán, May and Aparici 1981). A survey covering $0^h < \alpha < 24^h$ and $-36^\circ < \delta < 7^\circ$ is underway.

II. OBSERVATIONS AND RESULTS

The observations have been made with the 45 MHz large array at Maipú. The antenna is a transit telescope consisting of 528 dipoles distributed in a rectangular filled array with an effective area of 9650 m^2 (May *et al.* 1979). The radiotelescope interconnect the different groups of dipoles through a matrix of hybrid rings allowing the formation of 4 adjacent beams each one with the resolution $2.4^\circ \times 4.6^\circ$ and sensitivity $\sim 8 \text{ K}$ of the whole array. The fact that these beams can be used simultaneously makes the instrument specially suitable for a sky survey.

The observations have covered the region of the sky between 7.0° to -36.2° in declination and 0^h to 24^h in right ascension. A receiver bandwidth of 1 MHz and a time constant of 1 minute have been used.

Maps of the galactic center and the minimum of the galactic background radiation region at 45 MHz have been obtained. For the galactic centre an antenna temperatura of 89000 K was measured; considering the information at other frequencies an spectral index of -2.5 is obtained. The minimum of the galactic background radiation is located at $\delta = -36.8^\circ$ and $\alpha = 4^h$ with a brightness temperature of 3050 K; an spectral index of -2.6 is found.

This work has been partially supported by a grant from the Departamento de Desarrollo de la Investigación, Universidad de Chile.

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