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DETECTION OF JOVIAN RADIO EMISSION AT 20.1 MHZ WITH A DECAMETRIC RADIO ARRAY

Abstract

An array consisting of four dual dipole antennas has been built at the Sharjah Academy for Astronomy, Space Sciences, and Technology (United Arab Emirates) to conduct decametric radio observations. Based on the NASA radio Jove design, the array spans an area of about 400 square meters. The receiver of the array is designed to operate at 20.1 MHz to conduct observations of the Jupiter-Io interactions, solar bursts, and the background radio emission of the Milky Way. The main aim is to construct a system to initiate undergraduate students to radio astronomy research. In this paper, we report on the initial observations of several Jupiter-Io radio outbursts. These radio outbursts outline the exchange of charged particles between Jupiter and its closest moon Io through Jupiter's intense magnetic field. These observations are essential to understand the physical mechanisms that can cause the Jovian radio emission, especially the cyclotron maser emission mechanism. In this process, the charged particles that result from Io volcanic eruptions spiral around the Jupiter-Io magnetic field bridge to emit a hollow conical beam of radiation. Our long-term decametric radio observations, combined with other long-wavelength observations, can help us understand the Jupiter-Io interaction better. The array is located at 25.286 degrees N, 55.463 degrees E in the city of Sharjah. This project has been funded by the UAE Space Agency under grant fund number J03-2016-03.