# THE NEW 4-m MILLIMETER WAVE TELESCOPE AT NAGOYA

K. Kawabata
Department of Physics and Astrophysics, Nagoya University
Chikusa-ku, Nagoya 464, Japan

A new 4-m millimeter wave telescope has been constructed at the Department of Physics and Astrophysics, of Nagoya University, mainly for the purpose of making rapid surveys of interstellar molecular lines. The observing site is located on the Higashiyama Campus of the University at an altitude of 70-m above sea level in Nagoya. Observations with this telescope started in December 1983.

Fig. 1. The 4-m millimeter wave telescope at the Department of Physics and Astrophysics, Nagoya University.

The telescope is of the Cassegrain type with a beam-waveguide feed system and is usable in a frequency range between 80 and 300 GHz. the f/D ratio of the primary reflector is 0.493. The surface accuracy is better than 40 μm rms. The full width at half maximum of the main beam is 2!7 at 110 GHz. The full width at half maximum of the diffraction pattern, including the error pattern, is 12' and the power level of the diffraction pattern is 22dB below that of the main beam. The efficiency for the loss of gain to the diffraction pattern is 92%. The beam efficiency for the sun and the main beam efficiency are 80±5% and 74±5% respectively at 105 GHz where we have adopted for the brightness temperature of the solar disk center 6500 K. At present, we are employing a 15 K cooled Schottkey diode mixer receiver tunable in a frequency range between 80 and 120 GHz with a reflex klystron as a local oscillator. The diode mixer was designed and fabricated at our laboratory. The noise temperature is 200-250 K (DSB) in the frequency range between 85 and 116 GHz. The telescope is equipped with two acousto-optical spectrometers with band widths of 44 and 280 MHz each. They have 1100 channels and have frequency resolutions of 40 and 250 kHz respectively. These acousto-optical spectrometers are almost the same as those described in the

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article by Takano *et al.* (1983).

Winter is the best season for millimeter wave observations at the observing site. Astronomical observations have been made over more than 90% of the time in the winter from November through April. Observations of the J = 1-0 line of $^{12}CO$ can be done from December through April. Observations of the same line of $^{13}CO$ and $C^{18}O$ can be done from November through May. Actually we could obtain about ten thousand spectra of CO including isotopes in this season from January through May 1985. Spectral observations in the 90 GHz band can be done, except in a rainy season from June through July. Until now observations by the telescope have been carried out at the 88-115 GHz band and spectra of $^{12}CO$, $^{13}CO$, $C^{18}O$, $HCO^+$, HCN, CCH, and HNC have been obtained.

The performance of the telescope has been described in more detail in the article by Kawabata *et al.* (1985).

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