A BRIEF DESCRIPTION OF THE PENTICTON 26m TELESCOPE

In recent years, most of the observatory's effort has gone toward development and operation of the 7-antenna synthesis telescope. However, we continue to use the old 25.6m antenna for a variety of astronomical projects including observations of coarse structure to augment measurements made with the synthesis telescope.

The antenna is on a polar mount and can observe the entire sky visible from Penticton (latitude 49.32°). Hills to the south limit the declination range to north of -34° but even at declination -30° one can only see a source for about 2.5 hours. In the north, a cable-wrap limit prevents tracking a source below the pole. Slew rates in both coordinates are 15° per minute. Slower motions are available for precise setting of coordinates.

The antenna's position is transmitted by synchros to a PDP11/53 computer which operates as a slave to a much larger IBM 520 which, in turn, controls antenna drive motors, spectrometer and data logging.

Receivers are placed at the prime focus. Three focus boxes are available: (1) A "broad band" receiver for the 1.4 GHz hydrogen line which is usable up to about 1.7 GHz but is not recommended for the 1720 MHz OH line. This receiver usually measures two orthogonal linear polarizations. (2) A cryogenically cooled OH-line receiver which measures both circular polarizations. It operates at a system temperature of about 50K (3) A 6.6 GHz receiver for the Methanol line which measures both circular polarizations. The horn feed for this receiver can be moved automatically along the axis of the parabaloid to obtain an optimum focus. This receiver operates with a system temperature of about 90K. Other configurations can sometimes be arranged to observe at 408 MHz, 2.7, 4.9 and 8.4 GHz.

The antenna was originally intended for use at the 1.4 GHz hydrogen line for which its open-mesh surface is adequate. At this frequency aperture efficiency is about 55% (10 Jy/K). At 6.6 GHz efficiency falls to about 11% (50 Jy/K).

After amplification and filtering at the focus, signals are converted to an intermediate frequency of 150 MHz, then to 30 MHz and finally are fed to a 3-level autocorrelation spectrometer. Compensation for doppler shift is introduced by a computer-controlled generator acting as the final local oscillator.

Available bandwidths for the spectrometer are 4, 2, 1, .5, .25, and .125 MHz with 256 channels for each polarization. The spectrometer in use is almost identical to those used with the synthesis telescope.

Most observations are performed under computer control and it is common to program a sequence of observations several days in advance. The antenna can, if necessary run, for a week or more unattended.

John Galt 1999 Feb 18

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