

1. Using the ALFA receiver for OH observations

The ALFA detector was not designed for frequencies above 1530 MHz, although tests showed that the sensitivity at 1666 MHz is still useful. However, the calibration noise diodes are not operational at this frequency. Observations were made on 5 May 2006 of the OH/IR star B06500+0829 at 1667 MHz in order to calibrate the sensitivity of the outer pixels to the center pixel of the ALFA array. Immediately afterwards, the same source was observed using the L-wide receiver, and calibrated using the gain curve and system temperature for the pointing position. (The noise diodes of L-wide were not functioning reliably at this time.) The spectra using L-wide and the center pixel of ALFA are compared in Figure 1. The ALFA observations were made by setting the center pixel on the source for 1 minute, and then in each outer pixel successively, ending with the center again. The flux at 1667 MHz in each side of the source was integrated separately, and summed. The ratios of the integrated fluxes are shown in Figure 1 for both polarizations. The sensitivity is determined by both the telescope gain (G) and the system temperature (T) shown as the ratio G/T . The inverse of this ratio is the SEFD, or system equivalent flux density (SEFD). Pixel 3 performance has been improved since this time, as a bad cable was replaced in June 2005. The center pixel sensitivity to L-wide ratio was 0.570 and 0.483 for polA and polB, respectively. These values are consistent with those measured with total power measurements of the continuum source B0428+205 (3.8 Jy at 1666 Mhz) by P. Perrilat of 0.57 and 0.42 respectively, on 6 May 2005. Although ALFA covers seven simultaneous positions on the sky, the reduced sensitivity results in an increase in efficiency by a factor of 2.8 at this frequency.

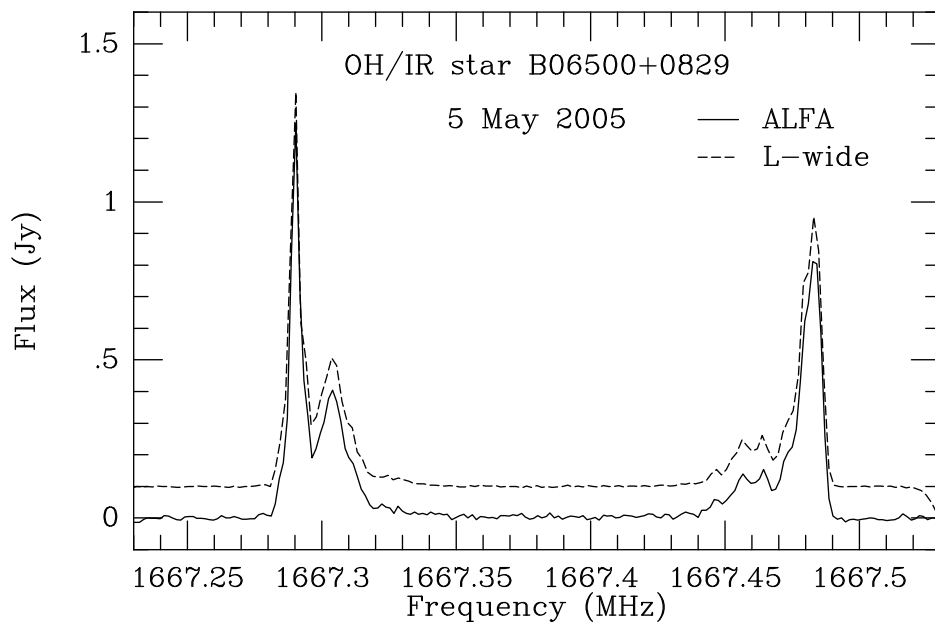


Fig. 1.— The OH/IR star B06500+0829 was observed with both ALFA and L-wide receivers in order to calibrate the performance. The L-wide spectrum is binned to the resolution of the ALFA spectrum and plotted, offset by 0.1 Jy for clarity. The spectra are nearly indistinguishable. The center pixel spectrum of ALFA is shown. The observations were made 16 minutes apart.

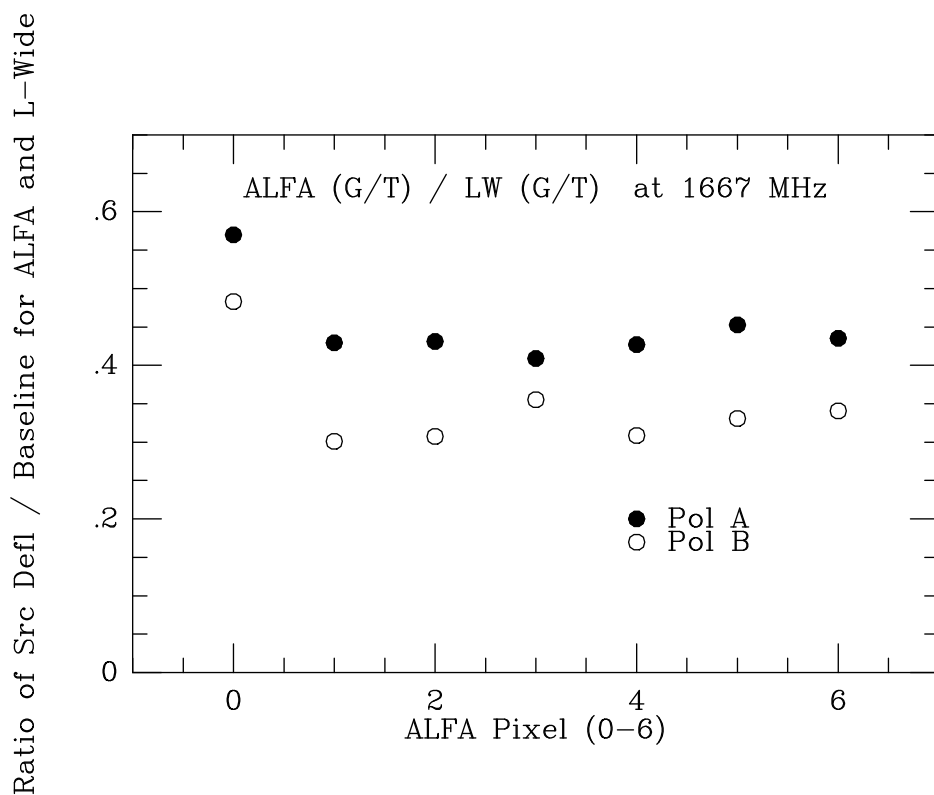


Fig. 2.— The OH/IR star B06500+0829 was observed to calibrate the performance of the ALFA 7-pixel beam receiver on 5 May 2005. The OH lines at 1667 MHz were observed both with ALFA and L-wide and the integrated fluxes were compared. The source was centered in the center beam, then in each outer beam successively, and again in the center beam at the end. The ratio of the flux in each beam to the flux in the L-wide receiver is plotted for each linear polarization. The source was measured using L-wide 16 minutes later.