

PROGRESS REPORT ON THE MARYLAND-GREEN BANK GALACTIC 21-CM LINE SURVEY

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Abstract. The survey has been completely re-observed using the resurfaced NRAO 300-ft telescope. It covers the latitude ranges $b = -1.5^\circ$ to $+1.6^\circ$ from $l = 11^\circ$ to 60° , $b = -2.2^\circ$ to $+2.4^\circ$ from $l = 60^\circ$ to 132° , and $b = -1.9^\circ$ to $+2.4^\circ$ from $l = 132^\circ$ to 235° . Both the new survey and the old survey are available on magnetic tape and 70-mm film.

In 1971–72 the entire survey was re-observed using the resurfaced 300-ft NRAO telescope. The new survey therefore does not suffer from the effects of the error beam, which influenced the old survey in the sense that small-diameter features appeared less intense with respect to the broad background by a factor of about 1.5. The old survey is available on magnetic tape and 70-mm film (antenna temperature in [R.A., v] contour diagrams at constant δ). It includes many observations made by other observers and in some places goes up to $b = 5^\circ$.

The new survey covers the region $b = +1.6^\circ$ to -1.5° between $l = 11^\circ$ and 60° and $b = +2.4^\circ$ to -1.9° between $l = 60^\circ$ and 235° . From $l = 60^\circ$ to 132° it is extended to $b = -2.2^\circ$. The effective beamwidth is 0.22° (13'), and the effective bandwidth is 2 km s^{-1} . The magnetic tapes give lines profiles, i.e., brightness temperatures as a function of velocity, at intervals of 0.1° in l and b . They are sorted in two ways: profiles at constant b , with l varying, and profiles at constant l with b varying (i.e., parallel and perpendicular to the galactic plane). If a limited region in l is to be studied, the 'perpendicular tapes' are obviously to be preferred. The total survey is available at cost on eight tapes in binary or 12 tapes in BCD (approximately; twice this number if both parallel and perpendicular tapes are needed). Limited sections in l or b may also be obtained.

The data have also been reproduced in the form of computer-generated contour maps. These are likewise available both parallel and perpendicular to the galactic plane: contour maps giving brightness temperature in an $l-v$ coordinate system, every 0.2° in b , and in a $b-v$ coordinate system, every 0.2° in l . A sample of one page of perpendicular maps is given in Figure 1. Altogether, there are 535 pages containing 1400 contour maps. Currently, these are on 70-mm film and are available in that form. It is hoped that funds can be found to publish these maps as the final edition of the survey.

Acknowledgements

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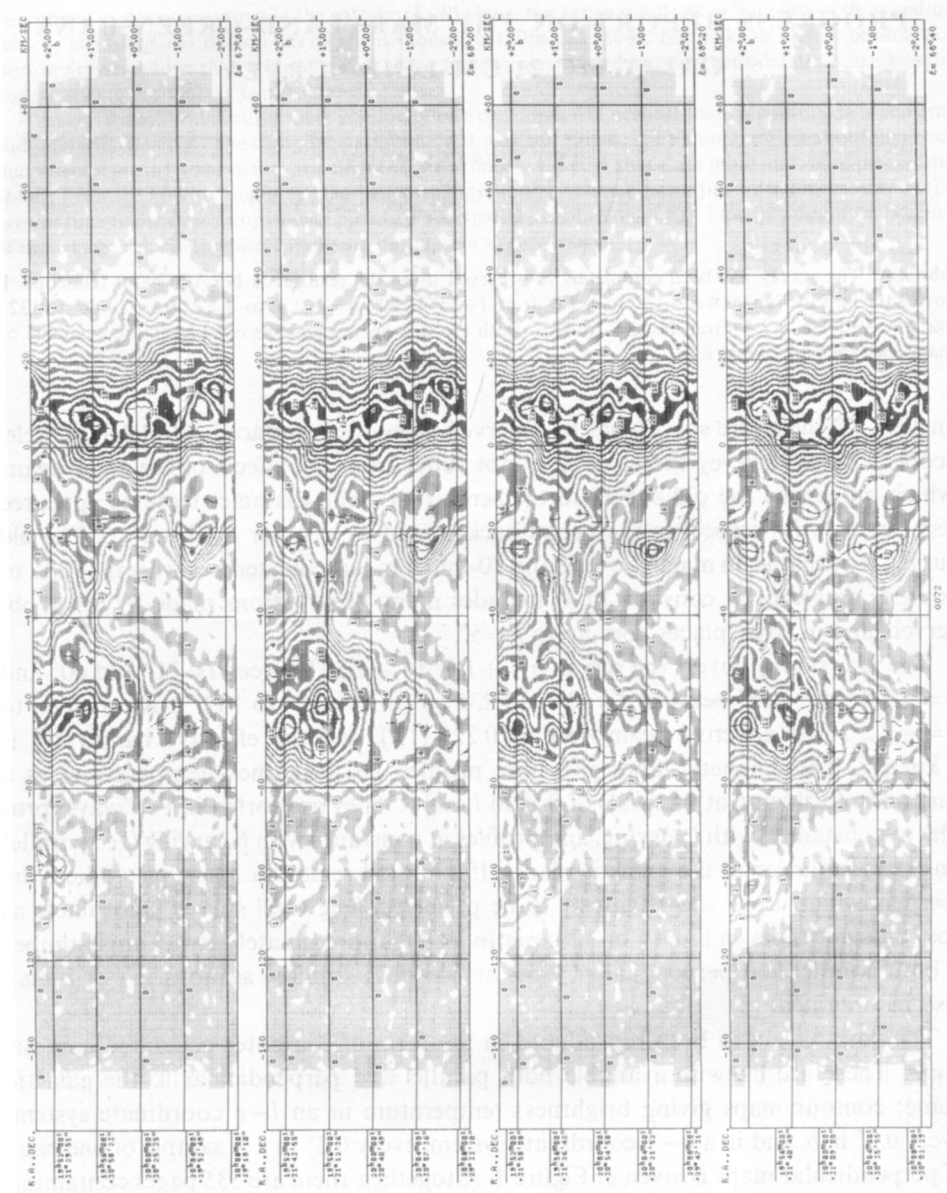


Fig. 1. Sample page from the survey. Contour intervals are 5 K in brightness temperature from 5 to 20 K and 10 K from 30 K up (label units are 5 K). Contour edges are 1.25 K above and below their nominal value (2.5 K from 30 K up); thus, the 50 K dark area goes from 47.5 K to 52.5 K, the blank area from 52.5 K to 57.5 K, etc. Wiggly black lines give the positions of maxima in the line profiles. R.A. and Dec. are for 1950.

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DISCUSSION

Burton: One characteristic which almost all low-latitude hydrogen profiles share is the sharp cut-off in intensities at the edge of the profiles corresponding to the outskirts of the Galaxy (negative velocities at $0^\circ < l < 180^\circ$). The cut-off is about as sharp as the kinematic cut-off contributed by hydrogen at the sub-central points. P. L. Baker (NRAO) is presently collecting more complete observations on this. Do you have any explanation for the sharpness of this cut-off? One gets the impression that the hydrogen boundary of the Galaxy is very abrupt.

Simonson: The sharp cut-off in the profiles at negative velocities for $l < 180^\circ$ is probably due to the hat-brim effect. We are seeing the bottom of the hydrogen layer rather than its edge.

Burton: This may be true at $b = 0^\circ$, but the effect is also present at latitudes where the line-of-sight intercepts the 'edge' of the hydrogen layer.

Weaver: As Kerr remarked, the velocity cut-off for the 'outer edge' of the Galaxy appears to be very sharp. This is true even where an entire contour map showing very low intensities is considered.