

21. GALACTIC CONTINUUM SOURCE COUNTS

T. L. WILSON

National Radio Astronomy Observatory, Charlottesville, Va., U.S.A.

The CSIRO 11 cm continuum survey of the galactic plane from $l^{\text{II}}=280^\circ$ to 37° has recently been finished. I have used this survey to compare the number of sources in various 5° intervals north and south of the galactic center. The NRAO-CSIRO-MIT H 109 α line survey (Wilson *et al.*, 1970) found 39 sources lying between 330° and 340° , while the NRAO-MIT (Reifenstein *et al.*, 1970) survey found only 14 between 20° and 30° . If the galaxy were symmetric, one would expect roughly equal numbers. One suspects a selection effect is present, and a rough check is very worthwhile. The CSIRO survey is particularly valuable since it is the highest resolution survey covering large portions of the galaxy on both sides of the center.

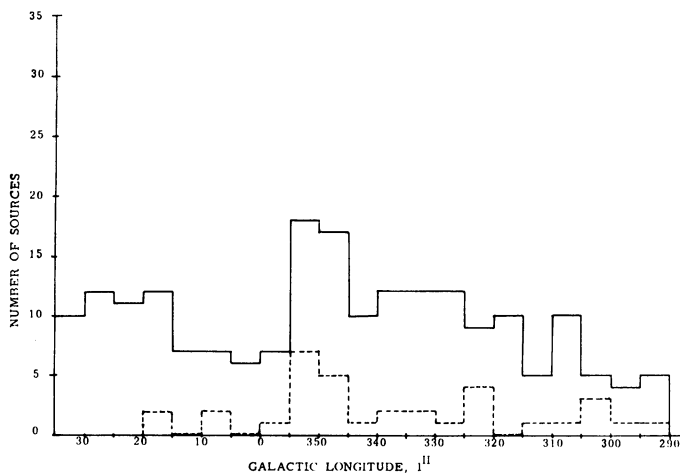


Fig. 1. Plot of number of sources per 5° interval, as a function of l^{II} . Solid line – source number. Dotted line – number of optically identified sources.

We have included only those sources which would be present in the H 109 α line surveys, that is those with peak brightness temperatures above 2K. These, averaged over 5° of longitude, form the solid curve, while the dotted curve is the number of optical identifications per 5° interval. The optical sources are taken from the RCW catalogue. The number of sources in the two zones 20° – 30° and 330° – 340° , are roughly the same, so that one concludes that the larger numbers found in the south are due to some selection effect, probably the higher angular resolution of the 210' radio telescope.

An interesting point is the large peak between 345° and 355° . This is probably mostly due to a nearby cluster of sources, although the H 109 α line shows that 5 sources

possess rather high velocities. This hypothesis is supported by the somewhat higher number of optical identifications and the low radial velocity found from the recombination line surveys. The velocities are shown in Figure 2.

The average velocities in the 345° – 355° zone are about -30 km s^{-1} , far below the maximum Schmidt model velocity -50 km s^{-1} for sources outside the 4 kpc arm at this longitude. The velocities in the 330° – 340° and 20° – 30° zones are much higher,

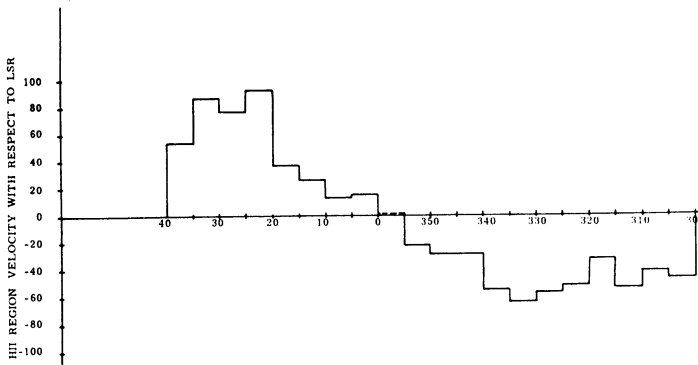


Fig. 2. H II region VLSR's averaged over 5° intervals, plotted against l^{II} .

although not equal. These last two zones, between 4 and 6 kpc from the center, contain most of the giant H II regions in the galaxy. They do not show up well in the 11 cm survey because they are quite distant and their individual sources cannot be resolved. The nearby sources bias us very strongly and only a knowledge of their distance, through their radial velocities, can tell us which are the nearby and which are the distant, significant features.

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References

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