

The Flocculent Structure of the Inner Milky Way Disk

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[W. B. Burton, Sterrewacht Leiden]

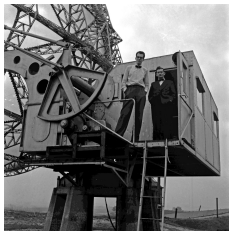
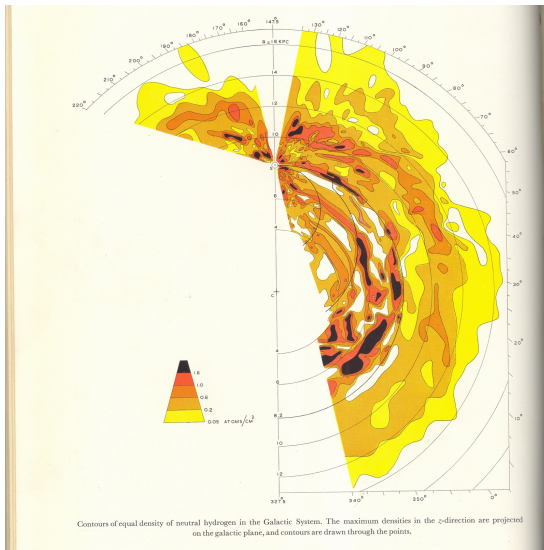


Image: Kootwijk 7 m

First H I Map of the Milky Way Disk



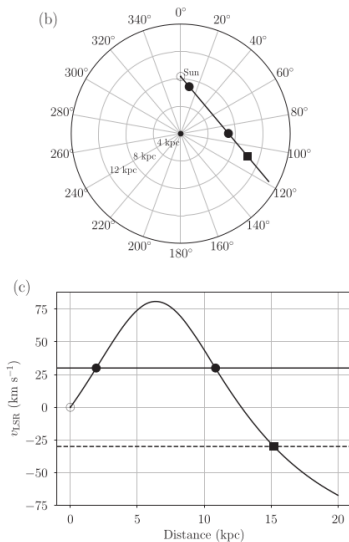
Westerhout, G. 1957, BAN, 13, 201.

Grand Design vs Flocculent



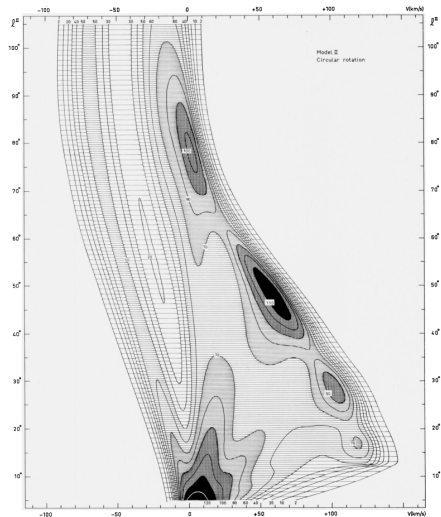
M101 (left; ESO) and NGC 4237 (right; NASA/ESA/Hubble/P. Erwin et al.)

Face-on Map: $(\ell-v) \rightarrow (x,y)$



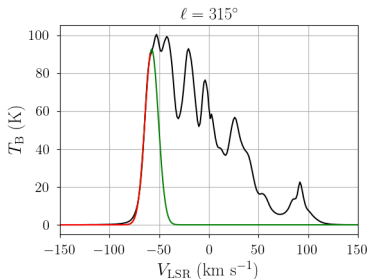
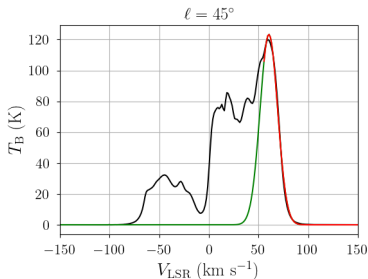
Wenger, T. V., Balser, D. S., Anderson, L. D., & Bania, T. M. 2018, ApJ, 856, 52.

Synthetic H I ℓ - v diagram



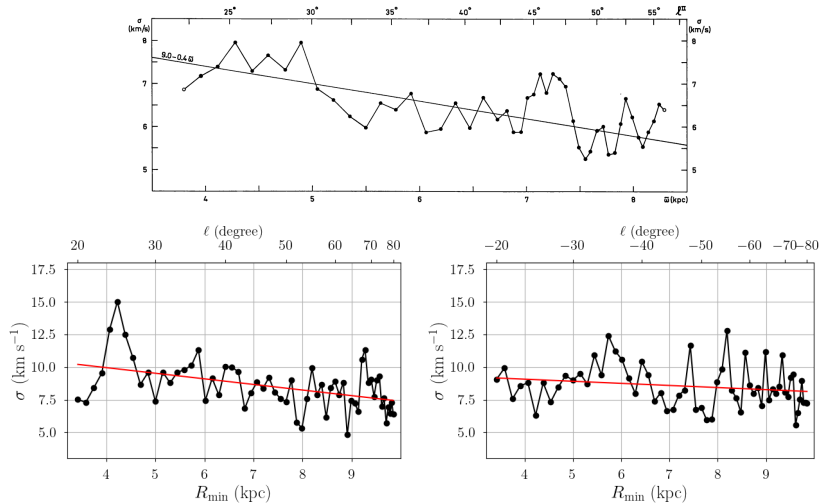
Burton, W. B. 1971, A&A, 10, 76.

Spiral Arm and Interarm Regions Near Subcentral Points



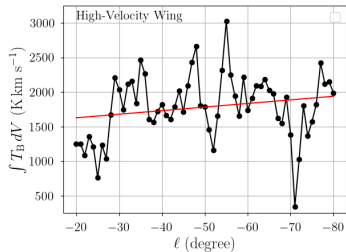
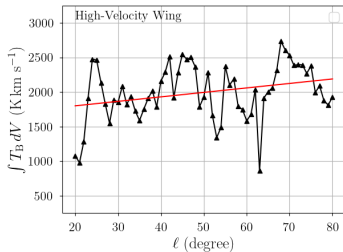
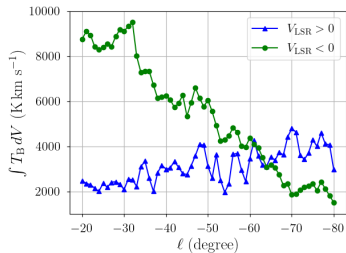
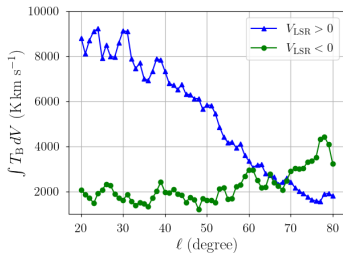
“The hydrogen density may, in fact, be so low in the tangent region that only a low-lying extension to the line profile is visible. No clear case of this has been observed...” Shane & Bieger-Smith

Apparent Velocity Dispersion Near Subcentral Points



Burton, W. B. 1971, A&A, 10, 76.; Balser, D. S., & Burton, W. B. 2025, AJ, 170, 355.

Integrated H I Brightness Temperature

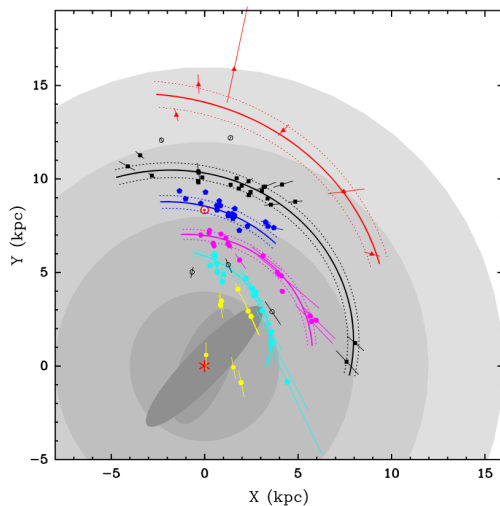


Balser, D. S., & Burton, W. B. 2025, AJ, 170, 355.

Conclusions

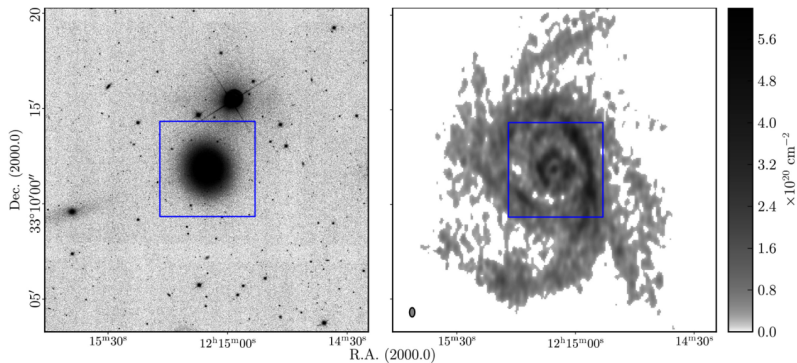
“We suggest that the inner Galactic disk is a collection of loosely clumped features, in an apparent state of disorder, which have been studied as “bones,” “spurs,” “rifts,” or “patches,” but which have not been shown to be arranged in large, connected features, or thus to partake in a clear spiral pattern....We suggest that it would be productive to explore further the possibility that the Milky Way is a member of the class of flocculent spiral galaxies.”

What about Maser Parallax-Determined Distances?



Reid et al. 2014, ApJ, 783, 130.

Why H I as a Tracer instead of CO or H II Regions?



SDSS (left) and H I (right). Yildiz et al. 2015, MNRAS, 451, 103.

What about Multiarmed Spirals?

