## DISCUSSION: LARGE-SCALE STRUCTURE AND KINEMATICS

**Paper:** **An overview of the structure and kinematics of the Magellanic Clouds**
**Author:** ***B.E. Westerlund***

FEAST: *If there are strong interaction effects in the LMC then presumably one need not insist that populations of all ages will have the same tilt.*

WESTERLUND: No, I refer to the tilt of the main population of the LMC when I suggest a 45° tilt. It will be of great interest to have accurate determination of the tilt for all measurable populations.

DOPITA: *In our paper on Constellation III that you refer to, we thought of the star-formation as spreading a little like lichen on a rock, very irregularly. We interpreted this as due to a shock from the collective effect of the stellar winds and SN being propagated in the intercloud medium, so that induced star formation occurs in shocked clouds after a long (and variable) latency period.*

WESTERLUND: Yes, I agree to this model. The fact that I wanted to be noted is that the arc LH 77 is 20 Myr old and far from the centre of the original star burst, whereas at that point there is an association of 4 Myr, only. Thus, the SSDSF may have worked but with many "delayed-action regions" behind it.

**Paper:** **Radio emission from the Magellanic Clouds**
**Author:** ***U. Klein et al.***

NORRIS: *It's curious that you get such good correlation between the far-IR and the 6 cm (presumably thermal) radio emission, whereas usually the radio far-IR correlation is attributed to non-thermal radio emission. Is it possible that the correlation in your images is due simply to centres of (all) activity in the LMC contrasting with regions in which nothing (no dust, no gas, no magnetic fields) is happening?*

KLEIN: Possibly, but this must await better data so we can separate the thermal and non-thermal emission.

WALBORN: *Do you think the sharp eastern edge and tailed western side of the LMC gas distribution could arise from a tidal event, possibly related to the formation of the 30 Doradur region?*

KLEIN: I believe that the sharp gradient of emission seen on the eastern edge is the result of the LMC's motion through the halo of the Milky Way. One would expect compression of magnetic fields there and a corresponding increase in the synchrotron emission. The same process has been considered previously in order to explain the observed gradients in gas density.

EKERS: *Comparison of your polarization images at 13 & 6 cm indicates substantial depolarization. Can this be used to determine the 3D structure? Could this be applied to the SMC also?*

KLEIN: For the LMC the answer is "yes". At 6 cm the polarization can be traced closer towards 30 Dor than at 13cm, owing to the decreasing depolarization. Depolarization appears to vary considerably over the region in which polarized emission is detected. For the SMC the answer is "no", because the detected polarization is very weak, the detection being marginal.



*R. Haynes and D. Milne (eds.), The Magellanic Clouds,* 118–121.

**Paper:** **An X-ray image of the Large Magellanic Cloud: detection of the hot interstellar medium**
**Author:** ***D.J. Helfand***

KOORNNEEF: *Does your work confirm that the interior of superbubble LMC- 4 is a diffuse x-ray source?*

HELFAND: No, there is no obvious excess of diffuse x-ray emission from the interior of LMC-4.

MEABURN: *Can you give a maximum age for the supernova remnants in the halo of 30 Dor which you see as discrete x-ray sources?*

HELFAND: Remnants which appear to have ages of up to a few x $10^4$ yr old have been detected.

**Paper:** **New results on the structure and stellar content of the outer regions of the Small Magellanic Cloud**
**Author:** ***L.T. Gardiner, M.R.S. Hawkins***

LEQUEUX: *Is the HI gas component sufficient to give the x-ray absorption of the extragalactic x-ray background you mention south of the 30 Dor - N 159 region, or do you also need a molecular component?*

GARDINER: We will be pursuing that question when we refine the analysis to give a quantitative estimate of the absorbing column density.

**Paper:** **Where is the rotation centre of the Large Magellanic Cloud?**
**Author:** ***R. Wielebinski, E. Bajaja***

de BOER: *The LMC gas comprises about 10% of the mass of the LMC. All the maps you showed describe young material. In large galaxies gas and stars are well related in motion, so if you wish to find a rotation centre you must compare with the radial velocity distribution of the stars.*

WIELEBINSKI: What is different here is the close proximity of the galaxy. In galaxies with interaction there are warps, spurs etc. Also the rotation planes of the young component are often different from the stars. An additional hint of a difference in the LMC/SMC/Galaxy system is the low absolute rotational velocity. I do suggest however that extensive modelling is necessary.

WESTERLUND: *The central cluster in 30 Dor is about $10^6$ years old. The "rotation centre" cannot have been there all the time. Where was it earlier in your model?*

WIELEBINSKI: I have done no modelling in time. I have examined existing HI data and find it consistent with rotation of the gas around 30 Dor. A 'ring' is suggested at R ~ 1Kpc with differential rotation beyond. Within the ring we see rigid rotation. This rotation is found in many other galaxies.

MATEO: *I just wish to point out that the existence of bright HII regions at the ends of bars in Magellanic type irregulars (as in the case of 30 Dor) is <u>not</u> uncommon. NGC6822 and IC4449 come immediately to mind, and de Vaucouleurs and Freeman (Vistas in Astron., ~1974) show many other examples. 30 Dor is not atypical.*

WIELEBINSKI: True, but in the case of 30 Dor we have so many components aligned in filaments. Also these (your) Magellanic type irregulars are not in such close interaction with a large spiral galaxy. Careful 3-dimensional analysis of all data is required.

https://doi.org/10.1017/S0074180900200181 Published online by Cambridge University Press

**Paper:** **Dust in the Magellanic Clouds**
**Author:** **Paul Hodge**

VAN DEN BERGH: *Is your ratio large $A_V$ value in the core of the SMC consistent with the observed dispersion in the Cepheid Period - luminosity relation?*

HODGE: Yes. The most reddened Cepheids show a similar extinction, within the observational uncertainties.

ALVAREZ: *The effectiveness of the background galaxy count rests, I suppose, on the assumption that the surface density of galaxies is uniform. Is that so? How good is that assumption?*

HODGE: Yes, that is so and it is a terrible assumption. For this reason it is necessary to go to galaxies as faint as possible.

MOULD: *What is $N_H/A_V$ in the LMC and the SMC?*

HODGE: The ratio calculated from the SMC data, making necessary assumptions, is approximately ten times the Galactic value. The LMC data are simply not yet good enough to be quantitative in this respect.

**Paper:** **HI-distribution, kinematics and geometry in the Magellanic Clouds**
**Author:** ***K. Rohlfs, Th. Luks***

WESTERLUND:
1. *I believe that Caulet and Deharvery showed some years ago that SGS2, south of 30 Dor, was expanding in all directions. They used HI and stellar velocities. Would your observations change that picture?*
2. *Also, this region south of 30 Dor has been assumed for about 30 years to be the next site for grand-scale star formation and your results support this.*

ROHLFS:
1. No, I do not think so. The local expansion phenomena produce quite small emission line profile components. I have been concerned more with large-scale effects that produce larger large components.
2. I do not know.

**Paper:** **Kinematics of the LMCs CH stars**
**Author:** ***F.D.A. Hartwick, A.P. Cowley***

FEAST: *Has any photometry been done on these stars?*

HARTWICK: No, photometry would be interesting.

MOULD: *Are the CH stars clearly distinguishable as a spectroscopic class, or do they form a continuum with the carbon stars observed for example by M. Azzopardi?*

HARTWICK: They are clearly distinguishable providing one has spectra in the blue-green region where the identifying features are found, namely CH bands, $Ba^+$ lines, and weakened metal lines. The R stars are quite different in this region and have been eliminated from the candidate list after moderate dispersion spectra were taken.

DA COSTA: *The distribution of your sample of CH stars on the sky does not look very smooth or very symmetric. Any comments?*

https://doi.org/10.1017/S0074180900200181 Published online by Cambridge University Press

**Paper:** **Large-scale structure and kinematics of the LMC from a study of long period variable stars**

**Author:** ***Shaun M.G. Hughes et al.***

ROHLFS: *Do the rotation parameters for the various population tracers (CH, HI etc.) give a consistent picture?*

HUGHES: Considering only velocities outside the bar (R>2°), all populations except the OLPVs were found to have similar lines of nodes and approximate flat rotation curves. The CH stars and old clusters were still found to have a lower systemic velocity. The OLPVs have a different line of nodes and a solid-body rotation solution.

MATEO: *Why is the Wielan scale-height-age relation applicable to the LMC where the molecular cloud mass function seems to differ from that in the Galaxy?*

HUGHES: The ages derived from the Wielan relation agree well with the ages inferred from the LPV pulsation mass calculations, and with the age of the PN, and therefore does appear to be applicable.

WHITELOCK: *Are you distinguishing between C-rich at O-rich LPVs?*

HUGHES: No. Most of the old LPVs are O-rich.

https://doi.org/10.1017/S0074180900200181 Published online by Cambridge University Press