PAPER 26

THE RADIO FREQUENCY SPECTRUM OF CASSIOPEIA A: A SYMPOSIUM SUMMARY

Ch. L. SEEGER
University Observatory, Leiden, Netherlands

Data presented at this symposium showed that there had been considerable progress during the previous year towards the solution of one of the basic problems in radio astronomy—the determination of the full radio frequency spectra of the discrete sources. The generally accepted plan is to

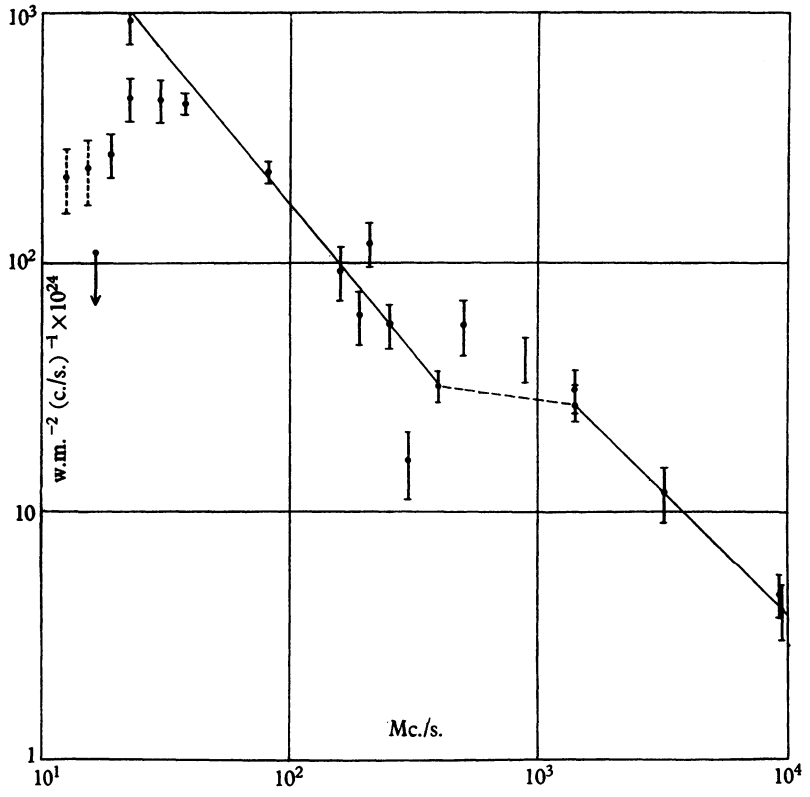

Fig. 1.

https://doi.org/10.1017/S0074180900049019 Published online by Cambridge University Press

establish the spectra of a few 'reference sources'. At present, these reference objects must be chosen from among the most intense sources, Cassiopeia A, Cygnus A, Taurus A and Virgo A. The utility of both Cygnus A and Taurus A is impaired by their close proximity to other discrete sources of appreciable strength. If they are to be observed with small antennas, meticulous interferometry, employing both variable spacing and variable azimuth, will probably be required in order to obtain an accuracy of 10 %. Cassiopeia A and Virgo A appear to be sufficiently in the clear for present needs, though only the latter is visible in both hemispheres and it is about twenty times less bright than Cassiopeia A. However, Cassiopeia A has received most attention so far. The effects of radiometer non-linearity must be examined, particularly at the lower frequencies, when calibrating Virgo A in terms of Cassiopeia A.

Table 1. *Flux density vzs. frequency for Cassiopeia A* (23*N*5*A*)

ν [Mc./s.]	S [w.m.$^{-2}$ (c./s.)$^{-1}$] $\times 10^{-24}$	O.P.I.R.* ± %	Observers and References
12·5	220	See paper	Wells, H. W. Paper 22
15·5	240	See paper	Wells, H. W. Paper 22
16·5	< 110	20	Lamden, R. J. and Lovell, A. C. B. Paper 21
19	272	20	Lamden, R. J. and Lovell, A. C. B. Paper 21
22·6	460	20	Lamden, R. J. and Lovell, A. C. B. Paper 21
22·6	940	20	Hey, J. S. and Hughes, V. A. *Nature*, **173**, 4409, 1 May 1954
30	450	20	Lamden, R. J. and Lovell, A. C. B. Paper 21
38	435	10	Adgie, R. L. Unpublished symposium paper
81·5	232	10	Adgie, R. L. Unpublished symposium paper
158	93	25	Brown, R. Hanbury and Hazard, C. *Mon. Not. Roy. Astr. Soc.* **113**, 123, 1953
193·5	62	25	Grebenkemper, C., McClain, E. F. and Hagen, J. P. (in publication); see also paper 20
210	121	20	Adgie, R. L. Unpublished symposium paper
250	57	20	Kraus, J. D., Ko, H. C. and Matt, S. *A.J.* **59**, 11, December 1954
300	16	30	Razin, V. A. and Pletchkov, V. M., as communicated to symposium by Dr S. B. Pikelner
400	32	15	Seeger, C. L. Paper 24
500	56	25	Adgie, R. L. Unpublished symposium paper
900	33–50	—	Denisse, J. F. Private communication
1420	31	20	Westerhout, G. *B.A.N.* **12**, 309 (no. 462), 1956. This is 'pine-tree' calibration.
1420	26·6	+20–15	Hagen, J. P., McClain, E. F. and Hepburn, N. Paper 20
3200	12	25	Haddock, F. T., Mayer, C. H. and Sloanaker, R. M. Paper 20
9400	4·6	20	Razin, V. A. and Pletchkov, V. M. Paper 25
9500	4	25	Haddock, F. T. and McCullough, T. P. Paper 20

* Observer's personal impression of reliability.

Though the principle of accurate absolute flux density measurement appears to be simple and straightforward, present-day practice has turned out to be unexpectedly difficult. Even with Cassiopeia A, measurements by different observers sometimes disagree by a factor of two or more. Nevertheless, the data on Cassiopeia A seem to be sufficiently consistent, and the spectrum of such intrinsic importance, to warrant the above tabulation and the accompanying curve (Fig. 1). I have tried to check each entry with the individual observer, since some of the data are published here for the first time. In the event of any errors or omissions, I herewith tender my most sincere apologies.