

COMMISSION 34: INTERSTELLAR MATTER AND PLANETARY
NEBULAE (MATIÈRE INTERSTELLAIRE ET
NÉBULEUSES PLANÉTAIRES)

Report of Meeting, 19, 20 and 25 August 1970

PRESIDENT: D. E. Osterbrock.

SECRETARY: T. K. Menon.

Business Meeting

The draft report was approved subject to minor corrections or additions.

The following resolution was adopted unanimously: "Commission 34 requests all future discoverers of planetaries to send the necessary data about new objects (at least R. A. 1950, Dec. 1950, identification charts) to the Organizing Committee of the Commission. All observers of planetary nebulae are requested to send one copy of their observing data to the Organizing Committee and one copy to Dr L. Kohoutek. This will make it easy to collect all observing material either for the Supplement of the *Catalogue of Galactic Planetary Nebulae* or for preparing a second edition of the 'catalogue'."

Scientific Meetings

PLANETARY NEBULAE

L. H. Aller reviewed the work on planetary nebulae since the 1967 IAU Meeting. Most of the material is included in the Draft Reports. He particularly stressed the outstanding problems such as the distance scale and model atmospheres for central stars.

Y. Terzian mentioned that the NRAO interferometer measurements show a source of size less than 1" at the center of NGC 7027 with a brightness temperature in excess of 100000 K.

W. Liller and B. Lasker reported that their independent measurements have shown no evidence for variability of any planetary nebula.

L. Higgs reported that out of 400 objects radio fluxes have been measured for about 120 planetaries.

M. Peimbert reported on his scanner measurements of the Balmer continuum to $H\beta$ ratio and the $\lambda 5007/4363$ ratio for 15 planetaries. He found a value of $T_e = 7000 \pm 1000$ K from the first ratio and about 11000 K from the second ratio. He suggested that the two temperatures refer to two different regions. He also found the ratio $He/H \approx 0.115$. He attributed the discrepancy from earlier work to overestimate of weak lines.

INTERNAL MOTIONS IN H_{II} REGIONS

M. G. Smith reported on Fabry-Pérot interferometer measurements of the nebulae M 17, η Carina, M 8 and M 20. The data suggest both expansion of these nebulae and simple doubling of line profiles in some cases. Because of the doubling effects the temperatures determined from line widths may not be relevant. J. Meaburn reported on his search for high velocity features in emission nebulae using single and double Fabry-Pérot interferometers. He suggested that many of the nebulae searched had either systematic or turbulent velocities in the range of 30 to 60 km/sec.

P. Mezger on the other hand reviewed the radio recombination line data and found no evidence for any expansion. He attributed the observed large scale motion to possible rotation of the nebulae.

In the ensuing discussion several speakers stressed the effects of angular resolution on the observed velocities.

R. Louise reviewed the French work on line profiles and radial velocities of H II regions. He suggested the possible existence of two kinds of H II regions, one a low-temperature type and the other a high-temperature type. Some have small variations of electron temperature inside, whereas others have large radial velocity and temperature variations inside.

In a session on new and important results the following papers were presented:

- H. M. Johnson and R. H. Rubin: Observation and Classification of the Nebula YM 29.
 Y. Terzian: New Low Frequency Observations of the Orion Nebula from the Arecibo Observatory.
 L. Goldberg and A. K. Dupree: Radio Recombination Lines and Their Use in Inferring the Properties of Nebulae.
 W. Liller: Planetary Nebulae and Their Exciting Stars.
 C. R. O'Dell: Dust in Planetary Nebulae.
 K. Serkowski and G. V. Coyne: Recent Advances in the Field of Interstellar Polarization.
 K. Nandy: Polarization in the Diffuse Interstellar Bands.
 J. M. Greenberg: The Distribution of Dust in the Merope Nebulae (By Title Only).
 J. M. Greenberg: Extinction by Roughened Particles, Dielectric and Metallic (By Title Only).
 B. H. Zellner: Polarization in Reflection Nebulae.
 H. Habing: X-Ray Heating and the Ionization of Interstellar He (By Title Only).
 J. S. Mathis: Internal Dust in Diffuse Nebulae.
 H. Zimmermann: The Dynamical Separation of Dust Particles During Cloud Collisions.
 K. Rohlfs: Association of Gas and Dust.
 R. Sancisi and H. Van Woerden: Motion of Neutral Hydrogen Connected with the OB Association in Lacerta.
 T. De Jong: H⁻ Densities and Interstellar Diffuse Bands.
 R. Henrikson: Pulsars in a Spiral Arm?

ENERGY CONTENT OF INTERSTELLAR GAS AND ITS LARGE-SCALE DYNAMICS

G. Haslam reviewed the radio and optical evidence regarding the structures known as spurs from radio studies. He suggested that the ridges of peak radio emission of the four well established spurs are in the form of small circles in the sky. Some of the spurs appear to have associated faint optical features. He suggested that all of them are shell structures viewed from various angles.

Elly Berkhuijsen reported on the distribution of neutral hydrogen in the vicinity of the continuum spurs. She suggested that the spur structures have associated with them neutral hydrogen clouds following closely the continuum emission ridges.

P. Seymour discussed the harmonic analysis of the optical polarization data, dividing the stars into five distance groups. His analysis suggested the existence of a magnetic field structure of the nature of a spur for the three lower distance groups.

W. Zuzak discussed the model of a spherical source of shocked relativistic electron gas expanding into the interstellar medium with magnetic field. He finds that at the inside surface of the shell the magnetic field varies very sharply and hence the synchrotron radio emission from such a shell can be expected to have sharp gradients at the edges. He suggested that the radio spurs may be such shells.

D. Wentzel discussed a mechanism by which the streaming of cosmic rays along magnetic fields can produce hydromagnetic waves which in turn can transfer their momentum to the surrounding gas. By this process cosmic ray energy can be used directly for the purposes of acceleration and heating of the gas without ionization. This will be particularly true near the edge of the galactic disk.

H. Habing reviewed the processes of heating and cooling of the interstellar medium. He pointed out that the cooling curves are still uncertain. However we probably still must have as yet unknown sources of heating in order to balance the cooling.

J. Bergeron and S. Souffrin described their new computations of heating of interstellar medium

by hard UV radiation and compared it with that produced by fast particles. No decisive observational tests are available yet to distinguish between the two processes.

W. Roberts reported on his work on shock waves, spiral structure and formation of stars.

REVISED CATALOG OF 2592 STARS OBSERVED FOR POLARIZATION

This catalog, published in 1958 (*USNO Publ.* 17, 285–331), provides 1900 positions and the old system of galactic coordinates. Thanks to the efforts of G. A. H. Walker, this polarization catalog has now been revised to contain 1975 positions, l^{II} and b^{II} . When available, detailed spectral types have been added. A limited number of printed copies of the revised catalog are now available free of charge. Send request to John S. Hall, Lowell Observatory, Flagstaff, Arizona, U.S.A.