ABSTRACTS

6.7.10 Flux Density Measurements of Parkes Sources at 430 MHz. A. E. NIELD and D. L. JANCEY. CSIRO, AUSTRALIAN TELESCOPIC RESEARCH COUNCIL, PARKES, N.S.W. - The flux densities of all sources in the Parkes 0°–15° 20' Catalogue (Day et al. 1966 Aust. J. Phys., 19, 35) have been measured at 430 MHz with the 100-ft spherical reflector of the Arecibo radio observatory. The calibration of the flux density scale is based on interpolation of the flux density at 430 MHz for sources with straight spectra from Kellermann, Pauling-Toth and Williams (1969, Ap. J., 157, 1). This scale, corrected for the difference in frequency, is 12% lower than the absolute scale of Wyllie (1969, Proc. ARA, 3, 9) in agreement with the approximately 10% expected. The rms percentage error of the 430 measurements is 5%, and the measured error distribution of confusion and noise has a standard deviation of 0.17 f.u. For the Parkes sources below 10 f.u., there is a systematic overestimation which increases with decreasing flux density as has been noted earlier in comparisons with the results from Bologna (Braccesi et al. 1965, Nuov. Cim., 28, 267) and Molonglo (Murdin et al. 1965, MNRAS, 121, 297). For sources with Arecibo flux density greater than 4 f.u., the approximate completeness level of the Parkes survey, the distribution of the revised spectral indices is compared with previous results. The correlation of angular size with flux density and with spectral index is investigated using Arecibo observations on interplanetary scintillations of Harris and Hardbeck (1969, Ap. J. Supp., 22, 115). The AO is operated by Cornell under contract to the NSF and with partial support from ARPA.

6.8.10 Galactic Absorption in the Zwicky Catalogue. T. W. NOONAN, Brockport State College, Brockport, N.Y. - The counts of galaxies in the Zwicky catalogue to a limiting photographic magnitude of 15.7 show a correlation with latitude indicating an absorption of (0.93 ± 0.023) ccm [b]. The stated standard error includes uncertainties in the slope of the count function log n(m) where n(m) is the density of galaxies to limiting magnitude m seen from outside the Galaxy. The brightness of the limiting magnitude of the Zwicky catalogue avoids the difficulty introduced by uncertainty in the slope of log n(m) when faint magnitudes are used, as in the Shane survey. As a by-product of the analysis, the constant C in the relation log n(m) = 0.6m - C for bright magnitudes is found to be 8.7 ± 0.2, in agreement with Holmberg's 1969 (Ark. of Ast. 5, 305) value.

6.10.10 The Stellar Content of M82. Robert W. O'Connell, Lick Observatory, Santa Cruz, California. - The stellar contents of two regions on the peculiar galaxy M82 have been investigated by spectral synthesis. One of the regions is identified as the nucleus of the galaxy on the basis of its surface brightness and inferred mass density; the other is spectrally representative of the disk of M82. Narrow-band spectrophotometry for both regions can be satisfactorily interpreted in terms of ordinary kinds of stars and dust prevalent in the solar neighborhood if 10^6 M_☉ of dust is mixed with the stars in the nucleus. There is no evidence for stellar abundance anomalies or the presence of significant amounts of non-stellar radiation except for gaseous emission between 3400 and 11000 Å. The intrinsic luminosity of the nucleus is L_ν = 3.0 x 10^46 erg/sec.

The deduced main sequence luminosity functions for both regions resemble that for the galactic disk in the solar vicinity except that an excess of massive stars (m < -3) exists in the nucleus and a deficiency, in the disk. Sufficient numbers of hot stars are present in the nucleus to maintain the observed level of nuclear interstellar ionization. The absence of massive stars in the disk is corroborated by photographic and spectroscopic evidence and may be the result of a suppression of star formation by a nuclear disturbance. The mass density inferred from the methods used for the small disk region observed is much higher than found in typical late-type galaxies.

The nature of the radiation from the filaments is discussed.

6.10.10 Variation in the Flux and Polarization of 4C39.25 at 8 GHz. E. T. Olsen and H. D. Aller, University of Michigan Radio Observatory. - A quasi-stellar radio source 4C39.25 has been continuously monitored over the last four years with the University of Michigan 85-ft paraboloid. During this period both the total flux density and its state of linear polarization have shown significant variations. During 1967 the total flux density remained constant, but commencing in early 1968 it has steadily increased by approximately 10% per year. This variation bears a striking similarity to that exhibited by 3C84, a Seyfert galaxy. Prior to the onset of the increase in the total flux density, the source had a degree of linear polarization equal to 2.19 ± 0.14% at a position angle of 142° ± 3°. In early 1968 the degree of polarization decreased to less than 1%. During 1970 the average degree of polarization has been 0.63% ± 0.13% at a position angle of 43° ± 9°.

6.12.10 Collision Strengths for Ultraviolet Emission Lines in Quasars. J. L. OSBORN and W. W. MOSTAKA, University of Wisconsin. - Several variations of collision strengths (proportional to collision cross sections) are necessary for calculating the emission line strengths predicted by any model of quasar emission, and in particular for quasar models. The important ultraviolet lines include permitted lines, forbidden lines, and semiforbidden (intercombination) lines. Fairly accurately calculated collision strengths are available for most permitted and forbidden lines, but for semiforbidden lines only rough estimates based on the conservation theorem have been available. Recently accurate collision strengths have been calculated for the semiforbidden 2s^2 3S^2 - 2p^2 3P transitions of the C III] isoelectronic sequence (1970 Astrophys. J., 160, 25). Other semiforbidden collision strengths will be calculated in time with a very general program being developed by Seaton, Eissner and others. However, in the interim, the available C III] sequence calculations can be used with the conservation theorem to estimate better approximations to the collision strengths for the other semiforbidden sequences. A table of the best available collision strengths is given, and a few samples of calculated emission-line strengths from various quasar models.

2.4.10 A New Model for Extended Radio Sources. W. J. MURPHY and J. L. TRIMBLE, Inst. of Theor. Aeron. Cambridge England. - The power output of active galactic nuclei may be furnished by a large number of collapsing stars or pulsar-like bodies. If these objects lose their rotational energy via electromagnetic torques, then the bulk of the power would emerge as electromag-