

TABLE OF CONTENTS

PART 1

SURVEYS, LUMINOSITY FUNCTIONS, AND EVOLUTION

M. G. SMITH	
QSO Luminosity Functions and Evolution	1
C. B. FOLTZ, F. H. CHAFFEE, P. C. HEWETT, B. FRYE, R. J. WEYMANN, S. F. ANDERSON, S. L. MORRIS, G. M. MacALPINE, and D. A. TURNSHEK	
The APM QSO Survey: Description and Status Report	25
J. A. STEPANIAN, L. K. ERASTOVE, V. A. LIPOVETSKY, and A. I. SHAPOVALOVA	
The Second Byurakan Spectral Sky Survey, Quasistellar Objects and Seyfert Galaxies	31
J. MAZA and M. T. RUIZ	
Seyfert 1 Galaxies in Calan-Tololo Survey	35
A. P. FAIRALL	
The Spatial Distribution of Seyfert Galaxies	37
A. SAVAGE, D. L. JAUNCEY, G. L. WHITE, B. A. PETERSON, W. L. PETERS, S. GULKIS and J. J. CONDON	
A Complete Sample of Flat-Spectrum Radio Sources from the Parkes 2.7 GHz Survey	39
S. CRISTIANI, C. BARBIERI, A. IOVINO, F. LA FRANCA, and A. NOTA	
Quasars in the Field of SA94 — A Colour Survey	41
A. R. PETROSIAN and M. SH. KARAPETIAN	
Multivariate Statistical Analysis of the Sample of AGN	43
D. TREVESE, D. C. KOO, and R. G. KRON	
Properties of a QSO Sample Selected Through Variability	47
C. BONOLI, F. BONOLI, L. DANESE, F. DELPINO, G. DE ZOTTI, G. GRANATO, and V. ZITELLI	
Multicolor CCD Photometry of a Homogeneous Sample of Seyfert 1 Galaxies	49
Y. CHU and X. ZHU	
The Destruction of Quasars Clustering at $z > 2$	51
P. KJAERGAARD, P. MÖLLER, M. JENSEN, and I. JÖRGENSEN	
A Search for Companions to High Redshift ($z \geq 3.0$) Quasars	53
L. SPINOGLIO and M. A. MALKAN	
A 12 μm Flux Limited Sample of Galaxies: Preliminary Results on the IR Luminosity Function	55

S. G. NEFF, J. B. HUTCHINGS, AND A. C. GOWER How Do Radio Quasars (for $z < 2$) Evolve?	57
V. PETROSIAN and D. CADITZ Quasar and AGN Evolution	59
A. WANDEL The Masses of Quasars and AGN: Correlating the Accretion-Disk and the Emission-Line Methods	62
N. SCOVILLE and C. NORMAN The Evolution of Starburst Galaxies to Active Galactic Nuclei	65

PART 2

BLR AND VARIABILITY

H. NETZER Structure and Nature of AGNs	69
M. V. PENSTON, E. PÉREZ, and M. MOLES Rapid Line Variations in High Luminosity AGN and Anisotropic Emission of the Optical/UV Continuum	85
I. I. PRONIK The NGC 1275 Galaxy Nucleus Emission Spectrum Variability at Various Stages of Activity	88
I. C. BUSKO and J. E. STEINER On the Broad $H\alpha$ Component of IC 5063, IC 5135 and NGC 2992	90
C. M. GASKELL, A. P. KORATKAR, and L. S. SPARKE Investigations of Broad Line Region Structure and Kinematics Using Variability	93
R. A. EDELSON and J. H. KROLIK The Discrete Correlation Function: A New Method for Analyzing Unevenly Sampled Variability Data	96
B. M. PETERSON Emission-Line Variability and the Nature of the Broad-Line Region	97
D. MAOZ Emission-Line Variability in AGN	100
R. W. GOODRICH Spectropolarimetry and Variability of Seyfert 1.8 and 1.9 Galaxies	103
J. H. BEALL, W. A. SNYDER, and K. S. WOOD Short Time Scale Variability of Active Galactic Nuclei: Einstein IPC Observations of PKS 2155-304 — A Report of Rapid Variations of Instrumental Origin	106

F. Z. CHENG, J. F. LU, G. Z. XIE, K. H. LI, Z. L. LI, and L. F. WANG Optical Short-Term Variability in the X-Ray-Selected BL Lac Object IE 0317+186 and the Radio-Selected BL Lac Objects ON231	108
E. I. ROBSON, T. J.-L. COURVOISIER, and P. BOUCHET Rapid Infrared and Optical Variability in 3C 273	110
T. J.-L. COURVOISIER, E.I. ROBSON, A. BLECHA, and P. BOUCHET 4 Years of Radio to X-ray Observations of 3C 273	112
E. I. ROSENBLATT and M. A. MALKAN Broad Line Variations in NGC 5548	114
H. R. MILLER and M. T. CARINI The Character of the Optical Variability for the BL Lacertae Objects OJ 287	116
M. A. STRAUSS, K. W. WACHTER, and A. V. FILIPPENKO Soft X-ray Variability and the Covering Fraction of Active Galactic Nuclei	118
M.-H. ULRICH The Complex Structure of the C IV Emission Line in the Seyfert 1 Galaxy NGC 4151 at Minimum States	120
V. JUNKKARINEN QSO Emission Line Redshift Differences	122
R. GREEN, P. OSMER, and A. PORTER Quasar Emission-Line Strengths	124
R. D. COHEN, R. J. RUDY, G. S. ROSSANO, R. C. PUETTER, and S. D. CHAPMAN Helium I λ 10830 Observations of Seyfert 2 Galaxies	126
M. JOLY Ca II - Fe II Correlation in Active Galactic Nuclei	128
T. R. KALLMAN, J. H. KROLIK, and B. J. WILKES Quasar Emission Line Profile Modelling	131
K. L. THOMPSON Observations of Quasar Broad-Line Profiles in the Optical and Infrared	133
S. L. MORRIS and M. J. WARD Optically Thin Gas in the BLR of Seyfert Galaxies	135
R. C. PUETTER Star Clusters in Quasars: Bloated Stars as Broad Emission Line Clouds	137

P. M. GONDHALEKAR	
Is There a Scaling Law for the Size of the BELR in AGNs?	139

PART 3

X-RAYS AND THE CENTRAL SOURCE

M. C. BEGELMAN	
Physics of the Central Engine	141
K. A. POUNDS and T. J. TURNER	
The EXOSAT Spectral Survey of Emission Line AGN	155
C. R. CANIZARES and J. L. WHITE	
The X-ray Spectra of High Redshift Quasars	161
K. KOYAMA	
Iron Line Emission from NGC 1068	167
C. M. URRY, J. S. KRUPER, and C. R. CANIZARES	
Soft X-ray Spectra of Seyfert Galaxies	173
D. A. SCHWARTZ, Y. QIAN, and W. H. TUCKER	
The Shape of Soft X-ray Spectra of Quasars	175
G. BRANDUARDI-RAYMONT	
EXOSAT Observations of Flux and Spectral Variability in the Seyfert Galaxy NGC 5548	177
J. P. D. MITTAZ and G. BRANDUARDI-RAYMONT	
The Flux and Spectral Variability of NGC 6814 as Observed with EXOSAT	179
R. S. WARWICK, T. YAQOOB, and K. A. POUNDS	
Variable X-ray Absorption in NGC 4151	182
M. ELVIS, J. McDOWELL, and B. J. WILKES	
The Infrared and X-ray Continua of Quasars: Is there a Connection?	184
B. J. WILKES, M. ELVIS, and J. McDOWELL	
Is There a Relation Between Optical Emission Line Strengths and Continuum Shapes?	187
S. TSURUTA	
Composite Spectra of Some Active Galactic Nuclei	189
P. BARR, P. GIOMMI, A. POLLOCK, G. TAGLIAFERRI, D. MACCAGNI, and B. GARILLI	
An X-ray Spectral Survey of BL Lac Objects	191
C. DONE and A. C. FABIAN	
Pair Production in AGN	194

D. M. WORRALL and B. J. WILKES A Comparison of the X-ray Spectra of Quasars and BL Lac Objects	197
R. J. V. BRISENDEN, I. R. TUOHY, G. V. BICKNELL, R. A. REMILLARD, and D. A. SCHWARTZ A Multi-Wavelength Study of X-ray Selected AGN	199
W. A. STEIN Spectral Index Versus Frequency and Models for the Continua of AGN and QSOs	201
I. M. GIOAI, T. MACCACARO, S. L. MORRIS, R. SCHILD, J. T. STOCKE, and A. WOLTER X-ray Selected AGN from the Extended Medium Sensitivity Survey	203
E. BOLDT X-ray Background Constraints on the Log N-Log S Relation for AGN	205
A. A. ZDZIARSKI Cosmic X-ray Background from Early Active Galactic Nuclei	207
A. KEMBHAVI, S. WAGH, and D. NARASHIMA Relativistic Beaming of X-rays from Quasars	209
J. G. KIRK Power-Law Spectra from Fermi Acceleration at Relativistic Shocks	211
P. L. BIERMANN Photon and Neutrino-Emission From Shockwaves in Active Galactic Nuclei	213
M. SIKORA, B. RUDAK, and M. BEGELMAN Relativistic Neutrons in Active Galactic Nuclei	215

PART 4

BLACK HOLES, ACCRETION DISKS AND GRAVITATIONAL LENSES

A. DRESSLER Observational Evidence for Supermassive Black Holes	217
R. D. BLANDFORD Quasar Evolution and the Growth of Black Holes in the Nuclei of Active Galaxies	233
N. ROOS Bright Quasars as Rapid Precessors	241
J. P. HALPERN and K. CHEN New Evidence for Accretion Disks in AGNs	245

A. LAOR The Spectrum of Massive Thin Accretion Disks: Theory and Observations	251
D. L. BAND and M. A. MALKAN Combined Accretion Disk and Nonthermal Source Model for AGN	253
S. COLLIN-SOUFFRIN and A. M. DUMONT Line Emission from Accretion Disks in Active Galactic Nuclei	255
H. A. SCOTT and S. L. O'DELL Spectra of AGN Accretion Disks – Preliminary Results	257
D. ALLOIN, T. BARIBAUD, C. BOISSON, and D. PELAT Revisiting the Geometry of the BLR in AKN 120: Preliminary Results from UV Data and Line Profile Analysis	259
W-H SUN and M. A. MALKAN Is the Lyman Absorption Edge a Good Observational Test for AGN Accretion Disks?	262
G. SWARUP, R. SUBRAHAMANYAN, D. NARASHIMA, and A. P. RAO Is the Flat Spectrum Double 1830-211 a Result of Gravitational Lensing?	265
S. REFSDAL and R. KAYSER Some Remarks on Gravitational Micro-Lensing	267
S. DJORGOVSKI and G. MEYLAN An Optical Imaging Search for Gravitational Lenses	269
G. MEYLAN and S. DJORGOVSKI Discovery of a Probable Gravitational Lens	271

PART 5

STRUCTURE OF THE CENTRAL OBJECT AND NLR

J. S. MILLER Observational Studies of the Structure of Active Galactic Nuclei and QSOs	273
J. KROLIK Theory of the Intermediate Zone	285
S. E. PERSSON and G. J. FERLAND Calcium Infrared Triplet Emission in AGN	293
V. I. PRONIK Narrow Line Region in NGC 4151 Nucleus	296
D. E. OSTERBROCK, R. A. SHAW, and S. VEILLEUX Near-Infrared Emission-Line Spectra of the Orion Nebula, NGC 4151, and Other Seyfert Galaxies	298

M. NISHIDA and K. KAWARA Near-Infrared Spectroscopy of Seyfert and Starburst Galaxies	301
W. G. MATHEWS and S. VEILLEUX Stability of Emission-Line Clouds in Seyfert Galaxies	303
S. RAWLINGS and R. SAUNDERS Using Narrow Emission Lines to Test Physical Models Unifying AGNs	305
M. WARD Anisotropic Continuum Emission in Seyferts	308
D. KAZANAS Red Giant Winds as Emission Line Clouds (Broad or Narrow) in Active Galactic Nuclei	310
S. VEILLEUX Substructures in the Narrow-Line Region of AGN	312
J. PALOUS Cloud Disruption and Formation	314
S. M. VIEGAS-ALDROVANDI and M. CONTINI Composite Models: A Tool for Interpreting the Emission-Line Spectra of Active Galactic Nuclei	316
M. CONTINI and S. M. VIEGAS-ALDROVANDI Theoretical Narrow Emission-Line Profiles of Active Galactic Nuclei	318
K. T. KORISTA and G. J. FERLAND The Origin of the Coronal Lines in Seyfert Galaxies	320
U. C. JOSHI, R. JAIN, and M. R. DESHPANDE Photopolarimetry of Seyfert Galaxies – NGC 2992, NGC 3081, NGC 3227, and IC 4329 A	321
D. WILLS, B. J. WILLS, R. J. ANTONUCCI, R. BARVAINIS, M. BREGER, J. A. BAILEY, J. M. HOUGH, and K. BALLARD High Optical Polarization in Flat-Spectrum Radio Sources	323
B. J. WILLS, D. WILLS, N. J. EVANS, A. NATTA, K. L. THOMPSON, M. BREGER, M. L. SITKO, D. T. LESTER, D. R. GARNETT, and S. R. SAWYER Polarization of IRAS Quasars and the Inner Structure of Active Galactic Nuclei	325
W. ZHENG How High a Density is for Photoionization in AGN?	327

I. M. YANCOULOVA and Z. I. TSVETANOV Reddening in the Narrow-Line Region of Active Galactic Nuclei	329
---	-----

PART 6

VELOCITY FIELDS, KINEMATICS, NL PROFILES

S. W. UNGER, K. TAYLOR, A. PEDLAR, H. GHATAURE, M. V. PENSTON, and D. J. AXON TAURUS Observations of Active Galaxies: NGC 1275 and NGC 4151	331
R. B. TULLY, J. BLAND, and G. CECIL First Results with HIFI - Studies of Extended Anomalous Emission Regions with an Imaging Fabry-Perot	337
J. BLAND and G. N. CECIL The Large-Scale Activity in NGC 1068	343
G. CECIL and J. BLAND Imaging Spectrophotometry of the Narrow-Line Region of NGC 1068	345
R. A. SHAW and M. M. DE ROBERTIS Emission-Line Asymmetries and the Kinematics of the Narrow-Line Region in AGNs	347
M. WHITTLE Gravitational Acceleration and Forbidden Line Widths in Seyfert Galaxies	349
H. SCHULZ and B. BOER A Separation of Systematic and Turbulent Motions in the Narrow-Line Region of NGC 4151	352
B. R. ESPEY, R. F. CARSWELL, J. A. BAILEY, M. G. SMITH, and M. J. WARD H α Emission Lines in High Redshift Quasars	355
N. KANEKO and T. SATOH The Velocity Field of NGC 1068	357

PART 7

DUST, MOLECULES, INFRARED AND MM RADIATION

T. M. HECKMAN CO in Seyfert Galaxies	359
A. F. M. MOORWOOD and E. OLIVA Infrared [Fe II] and H ₂ Line Emission in Active Galactic Nuclei	365
E. KRÜGEL Millimeter Observations of Markarian Galaxies	373

D. H. HUGHES and E. I. ROBSON Optical and Near Infrared Imaging of NGC 1275	376
R. P. NORRIS Are ELF's Little Monsters?	379
I. S. GLASS Delayed Infrared Emission from Luminous Seyfert 1 Galaxies	382
T. J. BALONEK, P. A. HECKERT, R. ELSTON, P. S. SMITH, and M. L. SITKO Optical-Infrared Continuum Spectra and Polarization of Quasars: An Outburst in 3C 279 During 1987-88	385
J. CLAVEL, W. WAMSTEKER, and I. GLASS Hot Dust on the Outskirts of the BLR in Fairall 9	387
G. NEUGEBAUER, D. B. SANDERS, B. T. SOIFER, S. PHINNEY, and R. F. GREEN Spectral Energy Distributions of PG Quasars	390
A. LAWRENCE New Millimetre Measurements and the Radio to X-ray Continua of Active Galactic Nuclei	393
J. KEENE, G. NEUGEBAUER, D. CARICO, D. SANDERS, and B. T. SOIFER Millimeter Observations of Optically Selected Quasars	396
M. A. MALKAN, W. K. P. GEAR, R. A. EDELSON, and E. I. ROBSON Submillimeter Observations of NGC 4151: Evidence for Thermal Dust Emission	398
G. M. MacALPINE and J. J. SALZER Optical and Far-Infrared Properties of UM Survey Emission-Line Galaxies	400
W. A. BAAN Megamasers in Young Active Galactic Nuclei	402
C. D. IMPEY, C. G. WYNN-WILLIAMS, and E. E. BECKLIN Infrared Emission from Radio Galaxies	404
J. P. VADER, J. A. FROGEL, F. C. GILLET, and M. H. K. DE GRIJP Dust-Embedded AGN in Unusually Warm IRAS Galaxies	406
C. A. HEISLER and J. P. VADER Morphological Properties of Unusually Warm IRAS Galaxies	408
R. ANTONUCCI, R. BARVAINIS, D. ALLOIN, and P. COLEMAN Testing the Emission Mechanism of the Quasar Infrared Component	410
V. ZITELLI, R. WADE, L. DANESE, G. DE ZOTTI, G. GRANATO, and N. MANDOLESI Infrared Imaging and Photometry of a Sample of Seyfert Galaxies	412

L. ARMUS, T. M. HECKMAN, and G. K. MILEY Longslit Optical Spectroscopy of Powerful Far-Infrared Galaxies	414
C. J. LONSDALE Faint IRAS Number Counts and Galaxy Evolution	416
A. C. VAN DEN BROEK IRAS Galaxies: Near-Infrared Colours and Starformation	418
P. J. GREEN, M. WARD, S. F. ANDERSON, B. MARGON, M. H. K. DEGRIJP, and G. K. MILEY Infrared-Selected "Warm" Galaxies Observed in X-rays	420
D. DULTZIN-HACYAN, M. MOLES, and J. MASEGOSA The Origin of the 25 μ m Emission in Seyfert 2 Galaxies	422

PART 8

RELATIONSHIPS OF NUCLEUS, GALAXY AND ENVIRONMENT

K. J. FRICKE and W. KOLLATSCHNY Relationships of the Active Nucleus, Galaxy, and Environment	425
A. R. PETROSIAN, K. A. SAHAKIAN, and E. YE. KHACHIKIAN The New Double Nuclei Markarian Galaxies	445
W. KOLLATSCHNY and K. J. FRICKE Activity of Interacting Galaxies Mkn 673: A Close-By "E+A" Galaxy	449
J. B. HUTCHINGS, S. G. NEFF, and J. H. VAN GORKOM The Twin-Nucleus Merging Galaxy MKN 266	452
R. W. POGGE Circumnuclear Emission in Nearby, Non-Interacting Seyfert Galaxies	454
H. K. C. YEE and M. M. DE ROBERTIS Optical Nuclear Activity in Radio Galaxies in Clusters	457
W. ROMANISHIN Color Maps of A 1795 and A 2597—Cooling Flow Cluster Central Galaxies with Active Nuclei	460
I. SHLOSMA, J. FRANK, and M. C. BEGELMAN Bar Instabilities and Nuclear Activity in Disk Galaxies	462
N. A. DEVEREUX Nuclear Starbursts in Barred Spirals	465
P. J. WIITA and A. ROSEN Interactions of Jets with Interstellar and Intergalactic Media	467

GOPAL-KRISHNA and P. J. WIITA Interaction of the Beams of Active Galactic Nuclei with Their Environment at High Redshifts	469
A. SOUBEYRAN, G. WLÉRIC, G. LELIÉVRE, B. SERVAN, L. RENARD, D. HORVILLE, A. BIJAOU, and P. BOUCHET 3C 120. Properties of 4 Condensations Neighbouring the Nucleus and Emitting in the Continuum	472
H. A. DOTTORI NGC 613: Nuclear Region Narrow Band Imagery	474
F. DURRET The Extended Ionized Nebulosities Surrounding the Active Galaxies NGC 6215, A 0945-30 and MCG-2-58-22	476
P. RAFANELLI Physical Properties of the Extranuclear Emitting Regions in Irregular and Interacting AGNs	478
J. C. SHIELDS and A. V. FILIPPENKO Long-Slit Spectroscopy of IC 5135 and NGC 4388	480
T. E. CARONE Long Slit CCD Observations of Active and Normal Galaxies	482
S. M. SIMKIN and E. M. SADLER Gas Disks in Radio Galaxies	484
M. G. PASTORIZA, E. MEDIIVILLA, and E. BATTANER Morphology and Luminosity Distribution of Seyfert Galaxies	486
P. PISMIS and E. MORENO Formation of Bi-Polar Spiral Features in Galactic Nuclei	488
J. M. MAZZARELLA and G. D. BOTHUN Far-Infrared Properties of Markarian Galaxies with Multiple Nuclei	490
G. DE ZOTTI, M. PERSIC, A. FRANCESCHINI, L. DANESI, G. G. C. PALUMBO, E. A. BOLDT, and F. E. MARSHALL X-ray Constraints on AGN Clustering	492
 PART 9 INTRINSICALLY WEAK AGNs	
A. V. FILIPPENKO Low-Luminosity Active Galactic Nuclei	495
W. C. KEEL High-Resolution Observations of the M81 Nucleus	513

T. STORCHI-BERGMANN and M. G. PASTORIZA Low Activity Nuclei with Strong [N II] Lines	515
G. FABBIANO Low-Activity Nuclei in Spiral Galaxies	517
D. C. KOO, R. G. KRON, and R. A. WINDHORST Optical Spectra of Low Flux Radio Sources	518
R. D. DAVIES, A. PEDLAR, D. J. AXON, B. VILA, E. HUMMEL, R. D. WOLSTENCROFT, and J. M. VAN DER HULST Activity in the Nuclei of Normal Sbc Galaxies – A Multiwavelength Study	520
J. M. WROBEL Low-Power Radio Sources in the Nuclei of Nearby E/S0 Galaxies: Evidence for Active Nuclei and for Current Star Formation	522

PART 10

RADIO GALAXIES, COMPONENTS AND STRUCTURE

T. J. PEARSON and A. C. S. READHEAD The Milliarcsecond Structure of Active Galactic Nuclei Observed with VLBI	525
A. E. WEHRLE Superluminal Motion in CTA 102	529
V. K. KAPAH, C. R. SUBRAHMANYA, and S. D'SILVA VLA Observations of an Optically Deep Sample of Molonglo Quasars: Aspect Dependence of the Optical Continuum	531
D. TAYLOR, J. E. DYSON, A. PEDLAR, D. J. AXON, and S. W. UNGER Compact Radio Components in Seyfert Nuclei	533
V. S. ARTYUKH Physical Conditions in Active Galactic Nuclei	535
C. AKUJOR Radio Observations of Moderately Compact Steep Spectrum Sources	537
W. B. McADAM Monitoring of Southern QSOs at 843 MHz	539
A. STOCKTON and S. J. LILLY Multicolor Images of a Complete $z \sim 1$ Sample of 3CR Galaxies	541
P. J. MCCARTHY, H. SPINRAD, and W. VAN BREUGEL Optical Properties of High Redshift Radio Galaxies	543

W. VAN BREUGEL and P. J. MCCARTHY	
Radio-Optical Correlations in Distant Radio Galaxies	546

PART 11

MISCELLANEOUS

J. BECHTOLD and S. A. SHECTMAN	
Statistical Properties of the Lyman α Forest	549
A. L. KINNEY, R. R. J. ANTONUCCI, and H. C. FORD	
Lyman Edges in Quasar Spectra	555
H. E. SMITH, R. D. COHEN, J. E. BURNS, D. J. MOORE, and B. UCHIDA	
Lyman α Emission from Disk Absorption Systems in QSOs: Star Formation in Young Galaxy Disks	557
A. I. DIAZ, E. TERLEVICH, and R. TERLEVICH	
Calcium Features in the "Featureless" Continuum of Seyfert Nuclei: Evidence for a Young Stellar Population?	560
G. BURBIDGE and A. HEWITT	
The Ejection of QSOs from Galaxies	562
M. KALINKOV, I. KUNEVA, Z. TSVETANOV, and L. FILIPOV	
Photometric Properties of AGNs from the Absolute Spectrophotometry of De Bruyn and Sargent	565
J. E. FELTEN and R. ISAACMAN	
Run of the Scale Factor $R(t)$ in Some Universes with Zero and Nonzero Pressure	567

PART 12

FUTURE

D. W. WEEDMAN	
The Future of Observational Research on Active Galactic Nuclei	569
G. A. SHIELDS	
Future AGN Research II	577
INDEX	589