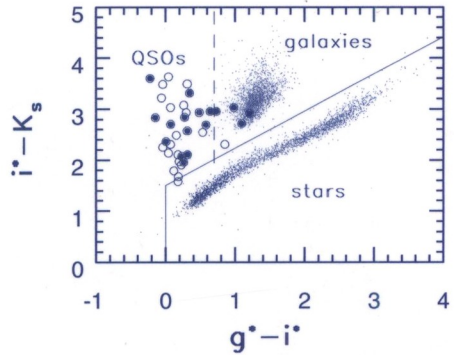
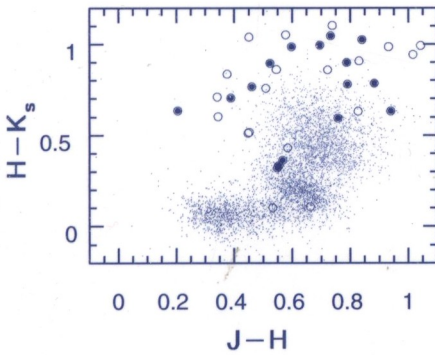
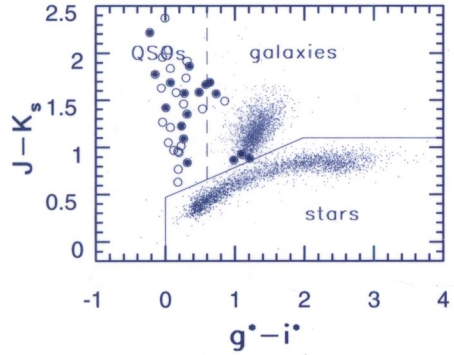
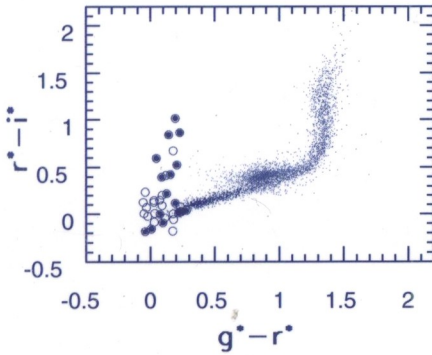




**AGN SURVEYS**  
**IAU Colloquium 184**



Edited by

**Richard F. Green, Edward Ye. Khachikian and David B. Sanders**

AGN SURVEYS  
IAU Colloquium 184

*COVER ILLUSTRATION:*

The cover shows an optical and near-infrared color-color diagram for stars (top) and galaxies (bottom) observed by both the Sloan Digital Sky Survey (SDSS) and the Two Micron All-Sky Survey (2MASS)

Ž. Ivezić, these proceedings, pg. 141

**A SERIES OF BOOKS ON RECENT DEVELOPMENTS IN  
ASTRONOMY AND ASTROPHYSICS**

**Publisher**

**THE ASTRONOMICAL SOCIETY OF THE PACIFIC**  
**390 Ashton Avenue, San Francisco, California, USA 94112-1722**  
**Phone: (415) 337-1100                      E-Mail: [catalog@astrosociety.org](mailto:catalog@astrosociety.org)**  
**Fax: (415) 337-5205                        Web Site: [www.astrosociety.org](http://www.astrosociety.org)**

**ASP CONFERENCE SERIES - EDITORIAL STAFF**

Managing Editor: D. H. McNamara                      LaTeX-Computer Consultant: T. J. Mahoney  
Associate Managing Editor: J. W. Moody                      Production Manager: Enid L. Livingston  
Production Assistant: Andrea Weaver

PO Box 24453, Room 211 - KMB, Brigham Young University, Provo, Utah, 84602-4463  
Phone: (801) 422-2111    Fax: (801) 378-4049    E-Mail: [pasp@byu.edu](mailto:pasp@byu.edu)

**ASP CONFERENCE SERIES PUBLICATION COMMITTEE:**

Alexei V. Filippenko	Geoffrey Marcy
Ray Norris	Donald Terndrup
Frank X. Timmes	C. Megan Urry

A listing of all of the ASP Conference Series Volumes and IAU Volumes published by The ASP may be found at the back of this volume

**ASTRONOMICAL SOCIETY OF THE PACIFIC  
CONFERENCE SERIES**



**Volume 284**

**AGN SURVEYS  
IAU Colloquium 184**

Proceedings of a Colloquium held at  
Byurakan, the Republic of Armenia  
18-22 June, 2001

Edited by

**Richard F. Green**

*National Optical Astronomy Observatories, Tucson, Arizona, USA*

**Edward Ye. Khachikian**

*Byurakan Astrophysical Observatory, Armenian National Academy of  
Sciences, Byurakan, The Republic of Armenia*

and

**David B. Sanders**

*Institute for Astronomy, University of Hawaii, Honolulu, Hawaii, USA*

© 2002 by Astronomical Society of the Pacific. All Rights Reserved

*No part of the material protected by this copyright notice may be reproduced or utilized in any form or by any means – graphic, electronic, or mechanical including photocopying, taping, recording or by any information storage and retrieval system, without written permission from the publisher.*

Library of Congress Cataloging in Publication Data  
Main entry under title

Card Number: 2002115616

ISBN: 1-58381-127-3

ASP Conference Series - First Edition

Printed in United States of America by Sheridan Books, Chelsea, Michigan

## Contents

Dedication . . . . .	xi
Preface . . . . .	xiii
SOC/LOC . . . . .	xv
List of Participants . . . . .	xvii
Conference Photograph . . . . .	xxii

### Part 1. Optical Surveys for AGN

Markarian's First Survey (FBS) – Some Most Interesting Objects . . . . .	3
<i>E. Ye. Khachikian</i>	
The Population of AGNs in Nearby Galaxies . . . . .	13
<i>L. Ho</i>	
The Second Byurakan Survey - The Final Results. The Multiwavelength AGN Survey in the SBS Area . . . . .	23
<i>J.A. Stepanian and V.H. Chavushyan</i>	
The Hamburg All-Sky Bright QSO Surveys . . . . .	33
<i>D. Reimers and L. Wisotzki</i>	
Objective Prism Emission-Line Searches for Active Galactic Nuclei . . . . .	43
<i>C. Gronwell, V.L. Sarajedini and J.J. Salzer</i>	
The US and Other Optically Selected Bright QSO Samples . . . . .	53
<i>K.J. Mitchell and P.D. Usher</i>	
Luminosity Function and Evolution of Optically Selected QSOs . . . . .	59
<i>L. Wisotzki</i>	
QSOs from a Variability-and-Proper Motion Survey . . . . .	69
<i>H. Meusinger, J. Brunzendorf, R.-D. Scholz and M. Irwin</i>	
Spectroscopic and Variability Surveys for AGN in the Groth Survey Strip . . . . .	75
<i>V. Sarajedini</i>	
Spectral Variability of Quasars in the Optical Band . . . . .	81
<i>D. Trèvese and F. Vagnetti</i>	
AGNs in Shakhbazian Compact Groups . . . . .	87
<i>A.S. Amirkhanian, A.G. Egikian, H. Tiersch and D. Stoll</i>	
A Morphological Optical Survey of Nearby AGN . . . . .	89
<i>C.S. Boschetti, S. Ciroi, J. Funes, A. Omizzolo, P. Rafanelli, G.M. Richter, A. Rifatto and J. Vennik</i>	

Byurakan Surveys: Density of Bright AGN . . . . .	92
<i>L.K. Erastova</i>	
Comparison of ELG and UV Galaxies from the SBS Survey . . . . .	94
<i>M.V. Gyulzadian</i>	
Seven Samples of SBS Galaxies in Selected Fields . . . . .	97
<i>S.A. Hakopian and S.K. Balayan</i>	
Properties of the Low- <i>z</i> NELGs from the VPM Survey . . . . .	99
<i>H. Meusinger and J. Brunzendorf</i>	
The Blue stellar Objects of the First Byurakan Survey . . . . .	101
<i>A.M. Mickaelian</i>	
The New BL Lac Candidates from the FBS . . . . .	103
<i>O.Kh. Torosyan</i>	
Probable Associations of BL Lac objects with Zwicky and Abell Clusters	106
<i>O.Kh. Torosyan</i>	
<b>Part 2. Infrared and Submillimeter Surveys for AGN</b>	
Spectroscopic Diagnostics for AGNs . . . . .	111
<i>S. Veilleux</i>	
The 2MASS Red AGN Survey . . . . .	127
<i>R.M. Cutri, B.O. Nelson, P.J. Francis and P.S. Smith</i>	
The Optical, Infrared and Radio Properties of Extragalactic Sources Observed by SDSS, 2MASS and FIRST Surveys . . . . .	137
<i>Ž. Ivezić, R.H. Becker, M. Blanton, X. Fan, K. Finlator, J.E. Gunn, P. Hall, R.S.J. Kim, G.R. Knapp, J. Loveday, R.H. Lupton, K. Menou, V. Narayanan, G.R. Richards, C.M. Rockosi, D. Schlegel, D.P. Schneider, I. Strateva, M.A. Strauss, D. Vanden Berk, W. Voges, B. Yanny, for the SDSS Collaboration</i>	
Dubious Deductions fom AGN Survey Data . . . . .	147
<i>R. Antonucci</i>	
Infrared Surveys for AGN . . . . .	157
<i>H.E. Smith</i>	
Unveiling the Evolution of Type I AGNs in the IR (15 $\mu$ m) – as Seen by ISO in the ELIAS-S1 Region . . . . .	167
<i>I. Matute, F. La France, C. Gruppioni, F. Pozzi and C. Lari</i>	
Testing the Unified Model with an Infrared Selected Sample of Seyferts	173
<i>H.R. Schmitt, J.S. Ulvestad, R.R.J. Antonucci, C.J. Clarke, J.E. Pringle and A.L. Kinney</i>	
Results from ISOCAM Deep Surveys: An Answer on the AGN Contribution to the Cosmic Infrared Background . . . . .	179
<i>H. Aussel</i>	

Blazars from the CLASS Survey . . . . .	189
<i>M.J.M. Marchã and A. Caccianiga</i>	
Discovery of Active Galactic Nuclei in Mid- and Far-Infrared Deep Surveys with ISO . . . . .	195
<i>Y. Taniguchi</i>	
A New MIR/submm Diagnostic for Dust-Enshrouded AGN . . . . .	205
<i>M. Haas</i>	
The Nature of the Faint Far-Infrared Extragalactic Source Population: Optical/NIR and Radio Follow-up Observations of ISOPHOT Deep- Field Sources using the Keck, Subaru, and VLA Telescopes . . . . .	213
<i>Y. Kakazu, D.B. Sanders, R.D. Joseph, L.L. Cowie, T. Murayama, Y. Taniguchi, S. Veilleux, M.S. Yun, K. Kawara, Y. Sofue, Y. Sato, H. Okuda, K. Wakamatsu, T. Matsumoto and H. Matsuhara</i>	
IRAS03158+4227 – a ULIRG in a Widely Separated Pair of Galaxies . . . . .	215
<i>H. Meusinger, B. Stecklum and J. Brunzendorf</i>	
The Byurakan-IRAS galaxy ( <i>BIG</i> ) Sample: The Redshift Survey . . . . .	217
<i>A.M. Mickaelian, S.K. Balayan and S.A. Hakopian</i>	
Search for Obscured IRAS Galaxies . . . . .	220
<i>A.M. Mickaelian, S.A. Hakopian and S.K. Balayan</i>	
 <b>Part 3. X-Ray Surveys for AGN</b>	
The Obscured AGN Population Probed by X-ray Observations . . . . .	225
<i>K. Iwasawa</i>	
The AGN Content of Hard X-ray Surveys . . . . .	235
<i>A. Comastri, C. Vignali and M. Brusa, on behalf of the HELLAS and HELLAS2XMM consortia</i>	
AGN Populations from Optical Identification of ASCA Surveys . . . . .	245
<i>M. Akiyama, Y. Ueda and K. Ohta</i>	
The X-ray Variability of High-Redshift QSOs . . . . .	251
<i>J. Manners, O. Almaini and A. Lawrence</i>	
New Results from the REX Survey . . . . .	257
<i>A. Caccianiga, M.J.M. Marchã, T. Maccacaro, A. Wolter, R. Della Ceca and I.M. Gioia</i>	
Optical Identification of X-ray Sources in a High X-ray Flux Sensitivity Area from the RASS . . . . .	259
<i>R. Mújica, F.-J. Zickgraf, V. Chavushyan, Y. Juárez, A. Serrano, I. Appenzeller and J. Krautter</i>	
AGN Search from Multicolor Photometric Observations of Faint ROSAT X-ray sources in a One Square Degree Field . . . . .	261
<i>S. Xue, X. Zhou and H. Zhang</i>	



**Part 4. Radio Surveys for AGN**

Surveys of Parsec-scale Radio Structures in AGN . . . . .	265
<i>L.I. Gurvits</i>	
Radio AGN Surveys . . . . .	275
<i>C. de Breuck, W. van Breugel, H. Röttgering and C. Carilli</i>	
AGN Selection by Size of Dominant Emission . . . . .	281
<i>P. Augusto and J.I. Gonzalez-Serrano</i>	
The Orientation of the Seyfert Nucleus in Mrk 348 . . . . .	289
<i>S. Antón, A. Thean, I. Browne and A. Pedlar</i>	
Optical Identification of Weak and Compact Radio Sources . . . . .	291
<i>V.S. Artyukh, M.A. Hovhannisyan, A.P. Mahtesyan and V.H. Movsesyan</i>	
The FIRST-APM QSO Survey (FAQS) in the SBS Region. Current Status	293
<i>V. Chavushyan, R. Mújica, J.R. Valdés, L. Carrasco, J. Stepanian and O. Verekhodanov</i>	
Energy Density and Radiation Losses in Giant Radio Galaxies . . . . .	295
<i>M. Jamrozy and J. Machalski</i>	
Compact jets in 100 AGNs with the Strongest Broad-band Variability of 1-22 GHz spectra in 1997-2001 . . . . .	297
<i>Yu.A. Kovalev, Y.Y. Kovalev, N.A. Nizhelsky and A.V. Bogdantsov</i>	
Survey and Analysis of 1-22 GHz Spectra for the Full Sample of 660 AGNs North of Declination $-30^\circ$ . . . . .	299
<i>Y.Y. Kovalev, N.A. Nizhelsky, Yu.A. Kovalev, G.V. Zhekanis and A.V. Bogdantsov</i>	
Different Types of Radio Sources and Possible Evolution of Radio Galaxies	301
<i>G.A. Ohanian</i>	
5-GHz VLBI Imaging Observations of 7 Equatorial AGNs . . . . .	304
<i>Z.-Q. Shen, D.R. Jiang, Y.J. Chen and T.-S. Wan</i>	
Decametric AGNs: FIRST and NVSS Maps and Radio Spectra . . . . .	306
<i>O.V. Verkhodanov, N.V. Verkhodanova and H. Andernach</i>	
IRAS F02044+0957: A Radio Source in an Interacting System of Galaxies	308
<i>O.V. Verkhodanov, V.H. Chavushyan R. Mújica, J.R. Valdés and S.A. Trushkin</i>	
Photometric Study of Radio Galaxies in the RATAN-600 "Cold" Survey	310
<i>O.V. Verkhodanov, Yu.N. Parijskij, N.S. Soboleva, A.I. Kopylov, A.V. Temirova, O.P. Zhelenkova and W.M. Goss</i>	
System to Estimate Ages and Redshifts for Radio Galaxies . . . . .	312
<i>O.V. Verkhodanov, A.I. Kopylov, N.V. Verkhodanova, O.P. Zhelenkova, V.N. Chernenkov, Yu.N. Parijskij, N.S. Soboleva and A.V. Temirova</i>	

**Part 5. AGN Phenomena**

Surveys of High-Redshift QSO Hosts . . . . .	317
<i>J.B. Hutchings</i>	
Are There AGNs in the Nearby Dwarf Galaxies ? . . . . .	325
<i>I.D. Karachentsev and V.E. Karachentseva</i>	
AGN and the Demographics of Supermassive Black Holes . . . . .	335
<i>R.F. Green</i>	
The Formation and Feeding of Massive Black Holes in the Early Universe	343
<i>W.J. Duschl and P.A. Strittmatter</i>	
Quasar Variability: New Surveys and New Models . . . . .	351
<i>M.R.S. Hawkins</i>	
Rapid Variations in the Broad H $\beta$ Profile of the Radio Galaxy 3C 390.3: Possible Evidence for Turbulence in the Accretion Disk . . . . .	357
<i>N.S. Asatrian, E.Ye. Khachikian and P. Notni</i>	
Rapid Variations in the Broad H $\alpha$ Profile of the Seyfert Galaxy Markarian 6: Possible Evidence for Turbulence in the Accretion Disk . . . . .	359
<i>N.S. Asatrian, E.Ye. Khachikian and P. Notni</i>	
Spectral Variability of Some Seyfert Galaxies . . . . .	361
<i>E.K. Denisyuk, V.N. Gaisina and R.R. Valiullin</i>	
Analysis of Color Variability of BL Lac during the 1997 and 1999 Outbursts	363
<i>V.A. Hagen-Thorn, V.M. Larionov, A.V. Hagen-Thorn, S.G. Jorstad and G.O. Temnov</i>	
AGN from the Perspective of New Approaches in Astrophysics . . . . .	365
<i>S.G. Iskudarian</i>	
Helical Structures in Seyfert Galaxies . . . . .	367
<i>A.V. Moiseev, V.L. Afanasiev, S.N. Dodonov, V.V. Mustsevoi and S.S. Khrapov</i>	
Correlation of Optical and X-ray Radiation of NGC 4151 and 3C 390.3. Preliminary Results . . . . .	369
<i>O.A. Novikova and N.G. Bochkarev</i>	
Energy Releases from Accreting Superdense Compact Objects in AGNs	371
<i>A.A. Sadoyan</i>	
Intermediate Resolution H $\beta$ Spectroscopy and Photometric Monitoring of 3C 390.3. I. Further Evidence of a Nuclear Accretion Disk . . . . .	373
<i>A.I. Shapovalova, A.N. Burenkov, O.I. Spiridonova, V.V. Vlasuyk, V.P. Mikhailov, L. Carrasco, V.H. Chavushyan, J.R. Valdes, F. Legrand, V.T. Doroshenko, V.M. Lyuty, N.G. Bochkarev, A-M. Dumont, S. Collin, O. Kurtanidze and M.G. Nikolashvili</i>	
Rapid Variations in the Seyfert 1 Galaxy Mrk 474 . . . . .	375
<i>R.R. Valiullin</i>	

**Part 6. Future Projects**

Using the NASA/IPAC Extragalactic Database (NED) and Federated Virtual Observatory Archives for Multiwavelength Studies of AGNs	379
<i>J.M. Mazzarella and the NED Team</i>	
New Statistical Methods for Analysis of Large Surveys: Distributions and Correlations . . . . .	389
<i>V. Petrosian</i>	
Digitization of the FBS: Its Future Use and Expected Results . . . . .	399
<i>A.M. Mickaelian</i>	

**Part 7. Summary**

Conference Summary . . . . .	411
<i>D.B. Sanders</i>	
Author Index . . . . .	423