

Galactic Center Workshop 2006 – From the Center of the Milky Way to Nearby Low-Luminosity Galactic Nuclei

Journal of Physics: Conference Series Volume 54

**Bad Honnef, Germany
18-22 April 2006**

Editors:

**Rainer Schödel
Geoffrey C. Bower
Michael P. Muno**

**Sergei Nayakshin
Thomas Ott**

ISBN: 978-1-61738-260-4

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2006) by the Institute of Physics
All rights reserved.

Printed by Curran Associates, Inc. (2010)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

TABLE OF CONTENTS

The Galactic Center Magnetosphere.....	1
<i>Mark Morris</i>	
The Strength and Structure of the Galactic Center Magnetic Field.....	10
<i>T N LaRosa, S N Shore, T Joseph, W Lazio, Namir E Kassim</i>	
Interaction Between the SNR Sagittarius A East and the 50-km s⁻¹ Molecular Cloud	16
<i>Masato Tsuboi, Sachiko K Okumura, Atsushi Miyazaki</i>	
Shock Interactions Between Sgr A East and Its Environments	22
<i>Sunggho Lee, Soojong Pak, T R Geballe, Sang-Gak Lee, Christopher J Davis, Minh Choi, Y C Minh, Robeson M Herrnstein, Paul T P Ho</i>	
Hot Molecular Gas in the Central Region Around Sgr A*	29
<i>María Montero-Castaño, Robeson M Herrnstein, Paul T P Ho</i>	
Physical Conditions and Molecular Chemistry of the Central Molecular Zone.....	35
<i>Nemesio J Rodríguez-Fernández</i>	
NH₃ Observations of the Central Molecular Zone with Kagoshima 6 Meter Radio Telescope.....	42
<i>Toshihiro Handa, Toshihiro Omodaka, Takumi Nagayama, Hayati Bebe lahak, Naohito Matsuyama</i>	
An Extremely Large Column Density Cloud G0.11-0.11 in the Galactic Center Region	47
<i>Toshihiro Handa, Masaaki Sakano, Seiichiro Naito, Masaaki Hiramatsu, Masato Tsuboi</i>	
3D Simulations of the 180pc Molecular Ring	52
<i>Myoungwon Jeon, Sungsoo S Kim</i>	
ISAAC M-band Spectroscopy of Dust Embedded Sources at the Galactic Center	57
<i>Jihane Moulata, Andreas Eckart, Thomas Viehmann, Rainer Schödel</i>	
Structure of the Galactic Bulge: Is the Milky Way a Double-barred Galaxy?	62
<i>Shogo Nishiyama, Tetsuya Nagata, Irsf/Sirius team</i>	
A Large-scale CO J = 3-2 Survey of the Galactic Center	67
<i>Tomoharu Oka, Makoto Nagai, Kazuhisa Kamegai, Kunihiko Tanaka</i>	
Odin Spectral Line Observations of Sgr A and Sgr B2 at Submm Wavelengths and in the 118-GHz Band.....	72
<i>Aa Sandqvist, P Bergman, P Bernath, U Frisk, Å Hjalmarsen, B Larsson, M Lindqvist, M Olberg, A O H Olofsson, L Pagani</i>	
OH 1720 MHz Masers in the Galactic Center: Sagittarius A East and the Circumnuclear Disk.....	77
<i>Y M Pihlström, L O Sjouwerman</i>	
CN in the Sgr A* Environment - First Results	81
<i>M Stanković, E R Seaquist, S Mühle</i>	
High Energy Emission from the Galactic Center	86
<i>Andrea Goldwurm</i>	
New X-ray Views of the Galactic Center Observed with Suzaku	95
<i>Katsuji Koyama, Yoshiaki Hyodo, Tatsuya Inui</i>	
The 6.7-keV Iron-Line Emission in the Galactic Centre	103
<i>Robert Warwick, Masaaki Sakano, Anne Decourchelle</i>	
Radio Pulsars and Transients in the Galactic Center	110
<i>Joseph Lazio, J S Deneva, Geoffrey C Bower, J M Cordes, Scott D Hyman, D C Backer, R Bhat, S Chatterjee, P Demorest, S M Ransom, W Vlemmings</i>	
Chandra Observations of the Galactic Center: High Energy Processes at Arcsecond Resolution	115
<i>Q Daniel Wang</i>	
A Candidate Neutron Star within the Radio Shell of Sgr A East	126
<i>Sangwook Park, Michael P Muno, Frederick K Baganoff, Yoshitomo Maeda, Mark Morris, George Chartas, Divas Sanwal, Gordon P Garmire</i>	
The Arches Cluster and G0.1-0.1 Cloud - A View with Fluorescent Lines	133
<i>Masaaki Sakano, Robert S Warwick, Anne Decourchelle</i>	
The H.E.S.S. View of the Central 200 Parsecs.....	140
<i>Jim Hinton</i>	
Viscous Dissipation in the Galactic Center Region	147
<i>Renaud Belmont, Michel Tagger</i>	
Confirmation of New Supernova Remnants Near the Galactic Centre.....	152
<i>S Roy, S Bhatnagar</i>	
Low Frequency Studies of the Galactic Centre with GMRT	156
<i>Subhashis Roy, A Pramesh Rao</i>	

Spitzer IRS Observations of the Galactic Center	161
<i>Janet P Simpson, Sean W J Colgan, Angela S Cotera, Edwin F Erickson, David J Hollenbach, Michael J Kaufman, Robert H Rubin</i>	
Circumstellar CO in OH/IR Stars Close to the Galactic Centre	166
<i>A Winnberg, S Deguchi, H J Habing, J Nakashima, H Olofsson, M J Reid</i>	
Comparison of Spitzer/IRAC Galactic Center 3.6-8.0 μm Survey Results with X-ray Emission in the Central 40 \times 40 Parsecs	171
<i>D Y Gezari, R G Arendt, R Smith, S Stolovy, F Yusef-Zadeh, C Law, H A Smith, H Moseley, S Ramirez, J Karr, A Cotera, K Sellgren</i>	
A Mid-Infrared Survey of the Inner 2 \times 1.5 Degrees of the Galaxy with Spitzer/IRAC	176
<i>S Stolovy, S Ramirez, R G Arendt, A Cotera, F Yusef-Zadeh, C Law, D Gezari, K Sellgren, J Karr, H Moseley, H A Smith</i>	
The Stellar Population in the Galactic Center: Insights from the Spitzer Space Telescope	183
<i>A Cotera, S Stolovy, S Ramirez, R Arendt, C Law, K Sellgren, D Gezari, F Yusef-Zadeh, H Smith, B Whitney</i>	
The Formation of High Mass Stars	190
<i>Cathie Clarke</i>	
The Two Young Star Disks in the Central Parsec of the Galaxy: Properties, Dynamics, and Formation	199
<i>T Paumard, R Genzel, F Martins, S Nayakshin, A M Beloborodov, Y Levin, S Trippe, F Eisenhauer, T Ott, S Gillessen, R Abuter, J Cuadra, T Alexander, A Sternberg</i>	
Star Formation in the GC: Observational Constraints and Theory	208
<i>Sergei Nayakshin</i>	
The Arches Cluster - Evidence for a Truncated MF in the GC?	217
<i>Andrea Stolte</i>	
Metallicity in the GC	224
<i>Francisco Najarro</i>	
Estimation of the Low-End Mass Function of the Arches Cluster	233
<i>Jihye Shin, Sungsoo S Kim</i>	
Galactic Structure and Stellar Clusters in Obscured HII Regions	238
<i>Maria Messineo, Monika Petr-Gotzens, Karl M Menten, Frédéric Schuller, Harm J Habing</i>	
Stellar Processes near Sgr A*	243
<i>Tal Alexander</i>	
Models of Mass Segregation at the Galactic Centre	252
<i>Marc Freitag, Pau Amaro-Seoane, Vassiliki Kalogera</i>	
The Structure of the Nuclear Stellar Cluster of the Milky Way	259
<i>Rainer Schödel, Andreas Eckart</i>	
Stellar and Wind Properties of Massive Stars in the Central Parsec of the Galaxy	266
<i>Fabrice Martins, Reinhard Genzel, Frank Eisenhauer, Thibaut Paumard, Thomas Ott, Stefan Gillessen, Sascha Trippe</i>	
First Infrared VLTI Fringes on Galactic Center Sources	273
<i>Jörg-Uwe Pott, Andreas Eckart, Andreas Glindemann, Rainer Schödel</i>	
Galactic Center Youth: Orbits and Origins of the Young Stars in the Central Parsec	279
<i>J R Lu, A M Ghez, S D Hornstein, M Morris, K Matthews, D J Thompson, E E Becklin</i>	
Stellar Orbits Around Sgr A*	288
<i>S Trippe, S Gillessen, T Ott, F Eisenhauer, T Paumard, F Martins, R Genzel, R Schödel, A Eckart, T Alexander</i>	
Massive Perturbers in the Galactic Center	293
<i>Hagai B Perets, Clovis Hopman, Tal Alexander</i>	
Ejection of Hyper-Velocity Stars by Intermediate-Mass Black Holes	301
<i>Holger Baumgardt, Alessia Gualandris, Simon Portegies Zwart</i>	
X-ray Constraints on the Number of Stellar Mass Black Holes in the Inner Parsec	306
<i>Patrick Deegan, Sergei Nayakshin</i>	
Thin Filaments at the Galactic Center: Identification and Proper Motions	311
<i>K Muzić, A Eckart, R Schödel, L Meyer, A Zensus</i>	
Photometric Stellar Variability in the Galactic Center	316
<i>M Rafelski, A M Ghez, S D Hornstein, J R Lu, M Morris</i>	
Resonant Relaxation Near the Massive Black Hole in the Galactic Center	321
<i>Clovis Hopman, Tal Alexander</i>	
Sub-Milliarcsecond Imaging of Sgr A* and M 87	328
<i>T P Krichbaum, D A Graham, M Bremer, W Alef, A Witzel, J A Zensus, A Eckart</i>	
Radio Spectra and Radio-Loudness of Low-Luminosity AGNs	335
<i>Akihiro Doi, Seiji Kamenoi, Makoto Inoue</i>	
The AGN Population in Nearby Galaxies	342
<i>Mercedes Filho, Peter Barthel, Luis Ho</i>	

The Millimeter Variability of M81*	349
<i>Rainer Schödel, Andreas Eckart</i>	
The Submillimeter Polarization of Sgr A*	354
<i>Daniel P Marrone, James M Moran, Jun-Hui Zhao, Ramprasad Rao</i>	
Flux Monitoring of Sagittarius A* at mm-Wavelengths	363
<i>Atsushi Miyazaki, Zhi-Qiang Shen, Makoto Miyoshi, Masato Tsuboi, Takahiro Tsutsumi</i>	
High Resolution Imaging of Sagittarius A*	370
<i>Geoffrey C Bower</i>	
High-Resolution Millimeter-VLBI Imaging of Sgr A*	377
<i>Zhi-Qiang Shen</i>	
Simultaneous Multi-Wavelength Spectrum of Sgr A* and Long Wavelength Cutoff at $\lambda > 30$ cm	381
<i>T An, W M Goss, Jun-Hui Zhao, X Y Hong, S Roy, A P Rao, Z-Q Shen</i>	
The Infrared Emission of the Dust Clouds Close to Sgr A*	386
<i>Y Clénet, D Rouan, D Gratadour, P Léna, O Marco</i>	
Multi-Wavelength and Polarimetric Observations of Sagittarius A*	391
<i>A Eckart, R Schödel, L Meyer, S Trippe, T Ott, R Genzel, K Muzic, J Moutaka, C Straubmeier, F K Baganoff, M Morris, G C Bower</i>	
Infrared/X-ray Intensity Variations and the Color of Sgr A*	399
<i>S D Hornstein, K Matthews, A M Ghez, J R Lu, M Morris, E E Becklin, F K Baganoff, M Rafelski</i>	
Diffraction Limited Imaging Spectroscopy of a Sgr A* Flare with OSIRIS	406
<i>A Krabbe, C Iserlohe, J E Larkin, M Barczys, M McElwain, J Weiss, S A Wright, A Quirrenbach</i>	
Variations in the Spectral Slope of Sgr A* During a NIR Flare	411
<i>Stefan Gillessen, F Eisenhauer, E Quataert, R Genzel, T Paumard, S Trippe, T Ott, R Abuter, A Eckart, P O Lagage, M D Lehnert, L J Tacconi, F Martins</i>	
Periodic Modulations in an X-ray Flare from Sagittarius A*	420
<i>G Bélanger, R Terrier, O C de Jager, A Goldwurm, F Melia</i>	
Accretion Models of Sgr A*	427
<i>Feng Yuan</i>	
Variable Accretion of Stellar Winds Onto Sgr A*	436
<i>Jorge Cuadra, Sergei Nayakshin</i>	
A Two Component Hot Spot/Ring Model for the NIR Flares of Sagittarius A*	443
<i>Leonhard Meyer, Andreas Eckart, Rainer Schödel, Wolfgang J Duschl, Michal Dovciak, Vladimir Karas</i>	
Testing General Relativity with High-Resolution Imaging of Sgr A*	448
<i>Avery E Broderick, Abraham Loeb</i>	
Growth of Black Holes and Dark Matter Accretion	456
<i>Faustin Munyaneza, Peter L Biermann</i>	
News from the Year 2006 Galactic Centre Workshop	461
<i>Mark Morris, Sergei Nayakshin</i>	
Infall, Fragmentation, and Outflow in Sgr B2	468
<i>Sheng-Li Qin, Jun-Hui Zhao, James M Moran, Daniel Marrone, N Patel, Sheng-Yuan Liu, Yi-Jehng Kuan, Jun-Jie Wang</i>	
Radio Linear and Circular Polarization from M81*	474
<i>Andreas Brunthaler, Geoffrey C Bower, Heino Falcke</i>	

Author Index