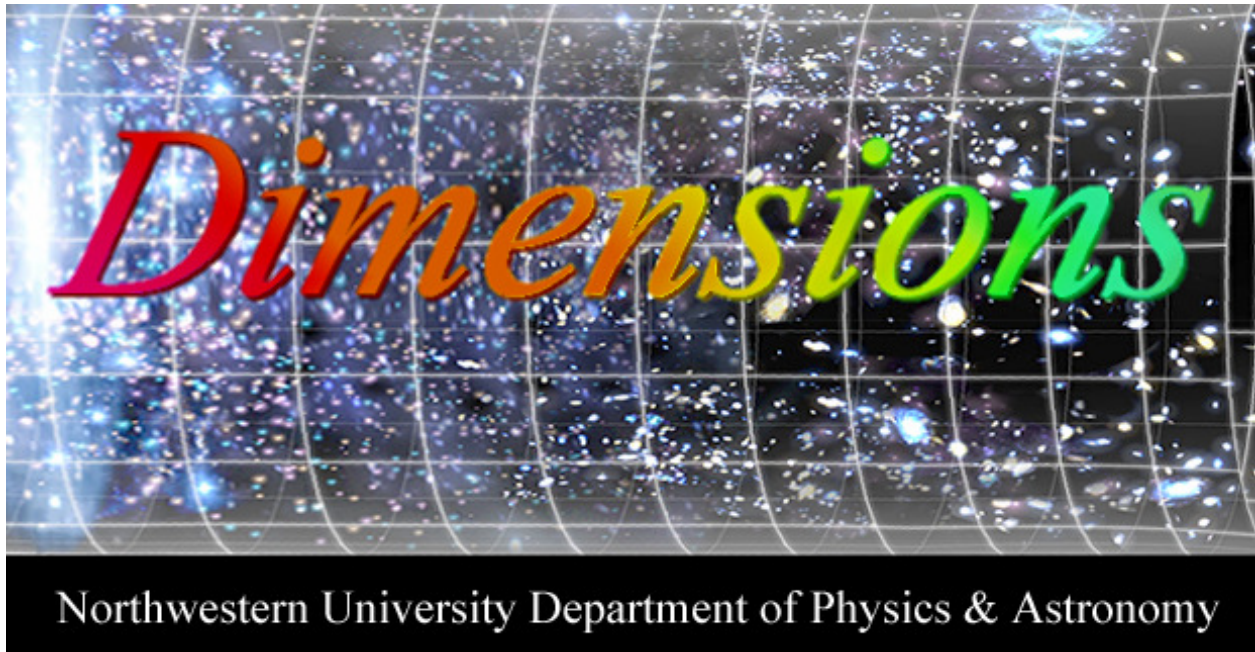


Spring 2007



Congratulations to our Graduates!

Doctoral Graduates

Student

Bo Chen
Anne Dabrowski
Geoffrey Dommett
Sarah Dugan
Wei Fang
Casey Law
Hua-Bai Li
Kirill Rivkin
Xiaohua Wu

Advisor

Bill Halperin
Mayda Velasco
Rodney Ruoff
Prem Kumar
Hui Cao
Farhad Zadeh
Giles Novak
John Ketterson
Hui Cao

What's Next

Postdoc, National Institute of Health
CERN Fellowship, Geneva, Switzerland
Contemplating a small business start-up
Adjunct Lecturer, Northwestern University
Research Assistant, NIST, Maryland
Postdoc, University of Amsterdam
Postdoc, Harvard-Smithsonian Observatory
Postdoc, Texas A & M University
Postdoc, Argonne National Laboratory





Bachelor Graduates

Student

Semyon Blinsein
Isaac Brown

What's Next

Graduate study in mathematics at UCLA
Begin work on an MS in education at NYU, with the goal of becoming a high school physics teacher

| | |
|--------------------|---|
| Oliver Chen |  (Moving on!) |
| Michael Downey | Seeking employment as a consultant in the Chicago area |
| Samuel Eckels | Graduate study in mathematics at the University of Wisconsin-Madison |
| Steven Ehlert | Will spend a year at the Max Planck Institute for Nuclear Physics in Heidelberg, Germany, as a DAAD Fellow, then begin work on a PhD in astrophysics at Stanford |
| Matthew Gill | Graduate study in mathematics at UC San Diego |
| Jesse Hall III |  (Moving on!) |
| James Hebden |  (Moving on!) |
| Grant Hetheron | Seeking employment, possibly in China |
| Jeffrey Kaplan | Graduate study in physics at Caltech, where he will be a Feynmann Fellow |
| Aaron Lee | Will spend a year at Cambridge University working on a Certificate for Advanced Study in Mathematics, then will enter the PhD astrophysics program at UC Berkeley |
| Thomas Lippman | Graduate study in physics at Stanford |
| Taejin (Lance) Min | Graduate study in physics at the University of Illinois-Urbana |
| Sasha Muratov | Graduate study in astronomy at the University of Michigan |
| Robert Rettew | Graduate study at Georgia Tech, as a President's Fellow in Georgia's Center for Excellence in Photovoltaics |
| Joseph Rodriguez |  (Moving on!) |
| William Shepherd | Graduate study at Northwestern University, where he will be a GAANN Fellow next year |



Future PhDs: Our New Graduate Students 2006-07



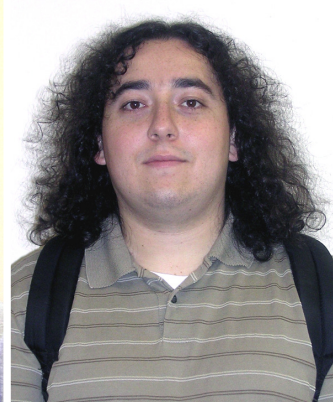
Israel Bichachi



Dibyendu Dey



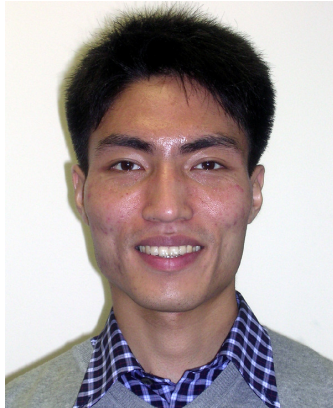
William Gannon



Rodrigo Guzman



Kunal Kumar



Joo Sang Lee



Benjamin Reddy



Sagar Sahasrabudhe



Hosung Seo



Benjamin Stripe



Francesca Valsecchi



Roberto Vega-Morales



Steven Won

AWARDS & RECOGNITIONS

Our Undergraduates

• *Drum Roll!!* – The Department's 2006-07 Award for Outstanding Senior Thesis in Physics and Astronomy goes to (three awards):

- ◆ Steven Ehlert (advisor: Mel Ulmer)
Temperature And Iron Abundance Gradients In High-Redshift Galaxy Clusters
- ◆ Jeffrey Kaplan (advisor: V. Kalogera)
Low-Frequency Non-Radial Oscillations Of Stars
- ◆ Aaron Lee (advisor: Fred Rasio)
Resonance Trapping In Protoplanetary Discs

• The 2006-07 Award for Outstanding Junior in Physics & Astronomy goes to:

- ◆ Yonatan Kahn (advisor: Michael Schmitt)
- *Phi Beta Kappa* – Congratulations to Steve Ehlert, James Hebden, and Aaron Lee, all of whom were recently elected to the Phi Beta Kappa Honor Society!
- *Goldwater Scholars* – In April, 2007, physics majors Yoni Kahn and James Kath were selected as Goldwater Scholars for 2007-08. Kahn, a junior, has been working in Prof. Michael Schmitt's research group on a new experiment to search for dark matter. This summer he will go to CERN in Geneva, Switzerland, to continue his research in particle physics. Kahn is a joint major in Physics and Music Performance. Kath, a sophomore, has until recently been working with Prof. Vicky Kalogera on a project related to the age determination of stellar clusters by using the cooling processes of white

dwarfs. He will be joining Prof. John Marko's research group this summer as an REU (Research Experience for Undergraduates) student. Kath is a double major in ISP and Physics.

Goldwater Scholars are selected on the basis of academic merit from mathematics, science, and engineering programs nationwide. The scholarships cover the cost of tuition, fees, books, and room and board up to a maximum of \$7,500 per year. The Goldwater Foundation is a federally endowed agency established by an act of Congress in November 14, 1986, to honor the late Senator Barry M. Goldwater. It is now the premier undergraduate award of its type in these fields.

• *DAAD Fellowship* – Senior Steve Ehlert has been awarded a DAAD (Deutscher Akademischer Austausch Dienst, or German Academic Exchange Service) Fellowship for 2007-08. DAAD was founded in 1971 to support academic exchange between the US, Canada, and Germany, and provides fellowships for both graduate and undergraduate students to study in Germany. Steve will be based in Heidelberg, where he will work on the HESS Project (High Energy Stereoscopic System), which is an array of imaging atmospheric Cherenkov telescopes designed to study cosmic gamma rays in the 100 GeV energy range. After he returns from Germany, Steve plans to enter the graduate astrophysics program at Stanford.

• *Kriegbaum Scholar* – Yoni Kahn was recently chosen as a 2007-08 Katherine L. Kriegbaum Scholar. These awards,

with no restriction as to the field of study, are granted to rising seniors in the WCAS. The distinction carries a \$1000 research stipend to support his research in particle physics, which he conducts as a member of Prof. Michael Schmitt's research group.

- *Aaron Lee featured in USA Today*
The following article appeared in the 2/20/07 issue of USA Today:

Between marching band practice and restarting the Northwestern chapter of Pi Mu Epsilon, the national Math Honor Society, Weinberg senior Aaron Lee found time to design evolutionary models of solar systems.

Lee's work inside and outside the classroom earned him a spot on USA Today's All-USA College Academic Third Team. Twenty students were named to each of the first, second and third teams.

For two years, Lee has studied the initial formation processes of solar systems and written his own code to analyze data. From this, he designed models concerning the orbits and evolution of planets in other solar systems. His findings will be published later this year in the *Astrophysical Journal*.

According to Tracey Wong Briggs, the coordinator of the All-USA Academic and Teacher Teams, the centerpiece of the application is the applicant's essay describing his or her most outstanding intellectual endeavor.

"We are looking for students who are extending academic knowledge beyond the classroom, beyond getting an A", Briggs said.

The program recognizes students for achievements in areas such as academic research, the arts, politics and public service. The team identifies students for what they have achieved as undergrads, not what they hope to do upon graduation.

"I didn't merely want to do observations," Lee said. "I can be part of suggesting answers to a much more general picture that will allow us to connect what we see observationally with mathematical models,

that we can use to predict where we came from and where we are going in terms of the evolution of the universe."

When the first planet outside of the Earth's solar system was discovered nearly a decade ago, scientists found that other solar systems were configured differently, Lee said.

Other solar systems show signs of instability, such as collisions, and to understand why, researchers look at how planets form and evolve, said physics and astronomy Prof. Fred Rasio.

Lee's research investigates what processes make the planets in our solar system remain in stable orbits while those in other systems do not.

"What makes our solar system so particular?" Lee said. "The thing we have to do now is develop new models to help us figure out what and how these systems came about."

Rasio advised Lee on the research, which also will serve as his senior thesis in physics.

"Aaron's research is pretty inspiring. It connects a lot of the human questions," Rasio said. "The big questions, like, what's the meaning of life? Are we alone in the universe?"

Rasio said he recognized early on that Lee was a top student with excellent technical skills and that he was ready for something "more real" in terms of research.

"I decided I would give him a real project from day one and let him sink or swim," Rasio said. "He's been swimming pretty well."

Our Graduate Students

- *AFCEA Fellowship* – In May, 2007, Meghan Anzelc was presented with a check for \$5000 by the AFCEA. The AFCEA is a non-profit association of electronics professionals dedicated to encouraging cooperative relationships between government agencies, the

military, and industry. Their Ph.D. Fellowship program seeks to reward excellence for demonstrated effort at the doctoral level of study, rather than the potential for such excellence.

Meghan is the first physics graduate student to win a Fellowship from the AFCEA since 1996. Meghan's faculty advisor is David Buchholz.

CERN Fellowship – Anne Dabrowski has recently been awarded a CERN Fellowship. CERN postdoctoral Fellowships are highly competitive, with only about 10% of the applicants accepted. Anne also recently won the \$500 student poster award at the 2007 Particle Accelerator Conference in Albuquerque, NM. Anne's faculty advisor is Mayda Velasco.

ISGC Fellowships – Peter Maksym and Jeremy Sepinsky have received \$10,000 Fellowships from the NASA-funded Illinois Space Grant Consortium. Peter's advisor is Mel Ulmer; Jeremy's advisor is Vicky Kalogera.

Our Faculty

- *ASG Teaching Awards* – Profs. Michael Schmitt and David Meyer have recently won recognition from the student body for their teaching. To quote the letters they received, “The Associated Student Government is pleased to inform you that you have been selected by the Northwestern student body as one of the outstanding Faculty of the Year for 2006-2007.”

- *Alumni Awards* – Senior Lecturer Mike Smutko is the recipient of a 2006-07 Arts and Sciences Alumni Teaching Award. Prof. Fred Rasio received a

2006-07 Research Mentor Award from the Alumni in recognition of his outstanding record as a mentor of undergraduates.

- *Research Highlighted* – In January, 2007, Fred Rasio and Bill Halperin had their research highlighted by Northwestern's *Newscenter*, an on-line newspaper. You can read the text of Fred Rasio's “Triple Interactions Of Supermassive Black Holes Found To Be Common In Early Universe,” and Bill Halperin's “Physicists Set Speed Limit for Future Superconducting Magnet” at: www.northwestern.edu/newscenter.

- *APS Fellows* – In late 2006, Hui Cao, John Marko, and Fred Rasio were elected Fellows of the American Physical Society. The APS Fellowship Program was created to recognize members who have made advances in knowledge through original research and publication or made significant and innovative contributions in the application of physics to science and technology. Each year, no more than one-half of one percent of the current membership of the Society can be elected as Fellows. Cao was also made a Fellow of the Optical Society of America.

- *Catalyst Award* – In October, 2006, Prof. John Marko and Prof. Philippe Cluzel of the Department of Physics at the University of Chicago jointly received a Catalyst Award from the Chicago Biomedical Consortium.

- *New Faculty* – New Adjunct Professors in the department are Sam Bader, who works in experimental condensed matter physics, Mike

Norman, who works in many areas of condensed matter theory, and Valerii Vinokur, who is noted for his work in superconductivity theory. All three professors are Senior Physicists at Argonne National Laboratory.

Our Alumni

- *Sloan Fellowship* – Northwestern graduate Vesna Mitrovic (PhD, 2001) was recently named a 2007 Sloan Fellow by the Alfred P. Sloan Foundation. Dr. Mitrovic conducted her PhD research in the NMR laboratory of Prof. William Halperin, and later was a Research Associate at CNRS in Grenoble, France. She is currently an Assistant Professor at Brown University. Dr. Mitrovic was previously the winner of an NSF Career Award (2006).

- *OJI Award* – Northwestern graduate Sean Fleming (PhD, 1995) was recently named an Outstanding Junior Investigator by the Department of Energy's Office of Nuclear Physics. Dr. Fleming conducted his thesis research in particle theory under Prof. Eric Braaten (now at Ohio State), and was

a Research Associate at Case Western and the University of Toronto. Dr. Fleming is currently an Assistant Professor at the University of Arizona. His research involves the application of QCD theory (Quantum Chromodynamics) to nuclear structure.

We Hear That . . .

➡ These students will be participating in Northwestern's 2007 NASA Summer Research Program (sponsor: Mel Ulmer):

College Summer Researchers

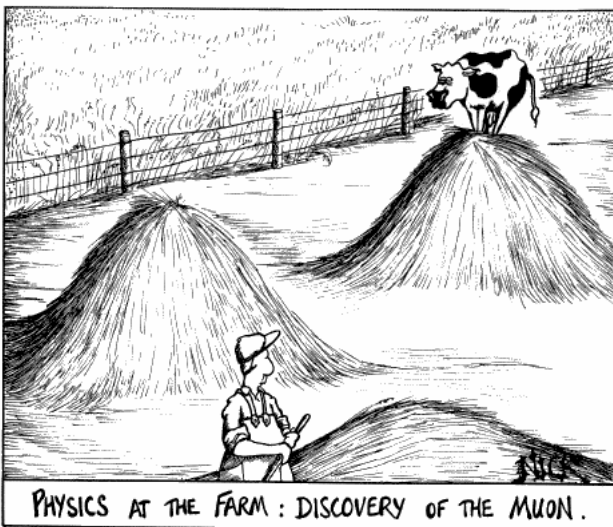
- Jeff Chilcote
- Alec Davis
- Rob Delmedico
- Steve Ehlert
- Jeff Kaplan
- Meagan Morscher
- Aisha Saleem

High School Summer Researchers

- Kiefer Aguilar
- Katheryn French
- Sam Simmons

➡ Stefan Cartledge (PhD, 2002) is currently a Visiting Assistant Professor at Valparaiso University where, coincidentally, Andy Richter (PhD, 2000) has been an Assistant Professor for the past two years. Stefan's advisor was David Meyer; Andy's advisor was Pulak Dutta.

➡ Dipangkar Dutta (PhD, 1999) has joined the faculty at Mississippi State University as an Assistant Professor. Dipangkar's advisor was Ralph Segel.



**RESEARCH AWARDS IN THE
DEPARTMENT OF PHYSICS & ASTRONOMY
MAY 2006 – MAY 2007**

David Buchholz

High Energy Physics Research
Department of Energy
December 2006 – November 2007
\$137,000

Novel Nanoscale Materials for Energy
Conversion Applications
U.S. Army RDECOM Acquisition Center
August 2006 – November 2007
\$124,070

David Buchholz & Heidi Schellman

High Energy Physics Research
Department of Energy
December 2006 – November 2007
\$359,000

Epitaxial Multifunctional Oxide
Heterostructures
DOE Subcontract: University of Wisconsin
September 2006 – August 2007
\$178,000

Hui Cao

Quantum-Classical Transition in Deformed
Microcavities
National Institute of Standards and
Technology
June 2006 – May 2007
\$30,000

Pulak Dutta

In Situ X-Ray Studies of Adsorption,
Nucleation and Self-Assembly at Soft and
Hard Surfaces
Department of Energy
November 2006 – October 2007
\$173,576

Venkat Chandrasekhar

Acquisition of a Field Emission Scanning
Electron Microscope for Electron Beam
Lithography and Nanoscience Education
U.S. Army RDECOM Acquisition Center
June 2006 – June 2007
\$181,994

Arthur Freeman

Quantum Engineering of Materials and
Devices
DARPA Subcontract: UC Davis
May 2006 – February 2007
\$45,000

Coherent Thermal and Electrical Transport in
Mesoscopic Structures
National Science Foundation
June 2006 – May 2008
\$230,000

Fundamental Electronic Structure
Characteristics and the Mechanical
Behavior of Materials for Aerospace
Applications
Air Force Office of Scientific Research
October 2006 – February 2007
\$52,083

Coherent Thermal and Electrical Transport in
Mesoscopic Structures (REU Supplement)
National Science Foundation
February 2007 – May 2007
\$6,625

Fundamental Electronic Structure
Characteristics and the Mechanical
Behavior of Aerospace Materials
Air Force Office of Scientific Research
March 2007 – November 2007
\$89,500

Electronic Structure and Novel Properties in
Complex Oxides and Hetero-Interfaces
Department of Energy
April 2006 – March 2008
\$121,912

Dynamic Microstructure Design Consortium:
Advanced Tools for Computational
Materials Engineering
ONR Subcontract: QuesTek Innovations LLC
May 2007 – September 2007
\$122,349

Bruno Gobbi

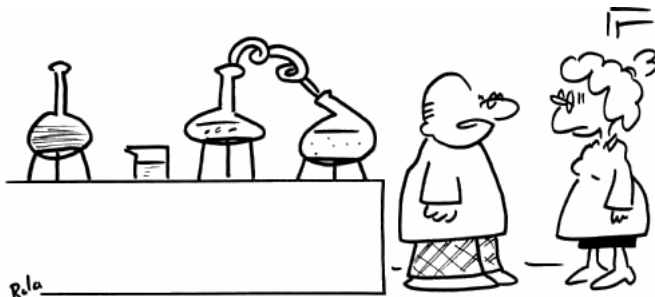
High Energy Physics Research
Department of Energy
December 2006 – November 2007
\$190,000

Research Support
DOE Subcontract: Fermilab
February 2006 – June 2006
\$59,109

William Halperin

Antiferromagnetism and Superconductivity
Department of Energy
July 2006 – June 2007
\$120,000

Order Parameter Structure in Thin Films and
Disordered Superfluid ^3He
National Science Foundation
August 2006 – July 2007
\$152,000



“I wanted to talk to Professor Blumenkraft
about his black hole project, but he’s
disappeared somewhere.”

Vassiliki Kalogera

A Deep X-ray Survey of the Small
Magellanic Cloud
NASA Subcontract: Smithsonian
Astrophysical Observatory
April 2006 – April 2008
\$14,976

Tidally Interacting Binaries and LISA
Astronomy: Waveform and Data Analysis
Studies
NASA
May 2006 – April 2007
\$86,036

Discrete X-Ray Source Populations and Star-
Formation History in Nearby Galaxies
NASA Subcontract: Smithsonian
Astrophysical Observatory
September 2006 – March 2007
\$17,706

Understanding the X-Ray Binary Populations
of Nearby Galaxies Revealed by the
Chandra Observatory: Super Star Clusters
and Starbursts (Fellowship for J. Sepinsky)
NASA Goddard Space Flight Center
September 2006 – August 2007
\$24,000

Fellowship in Science and Engineering
David & Lucile Packard Foundation
October 2006 – September 2007
\$125,000

Binary Compact Objects as Gravitational
Wave Sources: Modeling and Data
Analysis
National Science Foundation
November 2006 – October 2007
\$92,911

Binary Compact Objects as Gravitational
Wave Sources: Modeling and Data
Analysis (REU)
National Science Foundation
September 2006 – October 2007
\$36,204

CAREER: Theoretical Studies of Compact
Objects in Binary Systems
National Science Foundation
November 2006 – October 2007
\$108,479

**Vassiliki Kalogera, A. Bayliss, F. Rasio,
R. Taam, and F. Yusef-Zadeh**
Acquisition of a Versatile High Performance
Computing Facility for Gravitational Wave
Sources
National Science Foundation
October 2006 – September 2007
\$416,198

John Ketterson
Chalcopyrite and Orientation-Patterned
Semiconductors of Mid-IRT Sources:
Modeling, Growth and Characterization
DOD Subcontract: Stanford University
January 2006 – May 2006
\$54,200

Dynamic Flux Line Response in Layered
Superconductors with Tailored Defect
Structures
DOE Subcontract: University of Kentucky
Research Foundation
January 2006 – February 2006
\$2,927

Collaborative Research: Collective Mode
Spectroscopy in Unconventional
Superconductors
National Science Foundation
May 2007 – April 2008
\$65,244

Collaborative Research: Collective Mode
Spectroscopy in Unconventional
Superconductors (REU Supplement)
National Science Foundation
March 2007 – April 2008
\$7,000

NSF-Europe: Photonics, Plasmonics and
Molecule-Based Nanomaterials:

Preparation, Design, Properties
Optimization and Device Aspects
National Science Foundation
April 2007 – March 2007
\$100,000

John Marko
Statistical Mechanics of DNA-Protein
Interactions and Chromosome
Organization
National Science Foundation
January 2007 – July 2007
\$167,000

Giles Novak
Extragalactic and Galactic Surveys with the
Balloon-borne Large-Aperture Sub-
millimeter Telescope – BLAST
NASA
May 2006 – April 2007
\$12,376

From Dust to Planets – Multi-Wavelength
Polarimetric Studies of Protostellar Disks
(Fellowship for M. Krejny)
NASA Goddard Space Flight Center
July 2006 – June 2007
\$24,000

Laboratory Tests of VPM Technology
NASA Goddard Space Flight Center
May 2007 – May 2008
\$60,479

Robert Oakes & André de Gouvêa
High Energy Physics Research
Department of Energy
December 2006 – November 2007
\$87,000

Frederic Rasio
Binary Stars and Globular Cluster Dynamics
NASA
May 2006 – April 2007
\$106,216

Stellar Collisions in Dense Star Clusters and
Galactic Nuclei

NASA
May 2006 – May 2007
\$98,704

Intermediate-Mass Black Holes in Galactic
Nuclei and Starbursts

National Science Foundation
June 2006 – May 2008
\$241,750

Dynamics of Extrasolar Planetary Systems

National Science Foundation
August 2006 – July 2008
\$265,010

Dynamical Formation and Evolution of
Merging Compact Binaries

National Science Foundation
December 2006 – January 2008
\$32,996

Michael Schmitt

High Energy Physics Research
Department of Energy
December 2006 – November 2007
\$172,000

Ralph Segel

Physics with Rare Isotope Beams
Department of Energy
February 2007 – December 2007
\$64,000

Kamal Seth

Strong Interaction Studies with Medium
Energy Probes
Department of Energy
December 2006 – November 2007
\$325,000

Serhi Shafraniuk

A Multispectral Detector Based on an Array
of Carbon-Nanotube Quantum Wells
Air Force Office of Scientific Research
December 2006 – November 2007
\$70,318

Ronald Taam & Craig Heinke

Constraining the Temperature of the Neutron
Star in Sax J1808.4-3658
NASA
September 2006 – September 2007
\$41,351

Ronald Taam & Christopher Deloye

Bright X-Ray Binaries in Elliptical Galaxies:
Consequences of an Ultracompact Source
Nature

NASA Subcontract: Smithsonian
Astrophysical Observatory
January 2007 – January 2008
\$87,000

Melville Ulmer

Illinois Space Grant Consortium
NASA Subcontract: UIUC
March 2006 – February 2007
\$120,000

Studies of GaN-Based Films for UV
Photocathode

NASA Goddard Space Flight Center
January 2007 – December 2007
\$25,000

Observations of a Distant X-Ray Luminous
Cluster of Galaxies (XMM-Newton)

NASA
February 2007 – February 2008
\$35,000

Mayda Velasco

Development of Beam Instrumentation for
CLIC at the CTF3 Facility at CERN
Department of Energy
September 2006 – August 2007
\$45,000

Maintenance and Operations Activities

Related to the US CMS Hadron
Calorimeter M&O Subsystem

DOE Subcontract: Fermilab
October 2006 – September 2007
\$25,316

High Energy Physics Research
Department of Energy
December 2006 – November 2007
\$136,000

Farhad Yusef-Zadeh

A Legacy Study of Stellar Life Cycles at the
Galactic Center
NASA Subcontract: Smithsonian
Astrophysical Observatory
June 2006 – June 2008
\$30,000

GBT Student Support Program
NSF/NRAO
July 2006 – June 2007
\$9,000

The Mixed-Morphology SNR G359.1-0-5:
Birthplace of the Mouse
NASA Subcontract: Smithsonian
Astrophysical Observatory
September 2006 – September 2007
\$54,292

A Large-Scale Survey of the Galactic Center
at 24 Microns
NASA Subcontract: Jet Propulsion
Laboratory
October 2006 – May 2008
\$18,234

Precise Measurements of Sgr A* Flare
Activity
NASA Subcontract: Space Telescope Science
Institute
April 2007 – November 2007
\$38,241

Have a great summer!

