

## ACADEMIC POSITIONS

**University of Maryland**, College Park, MD

Hubble Postdoctoral Fellow

University PI: Prof. Christopher Reynolds

2011, Aug -

## EDUCATION

**Harvard University**, Cambridge, MA

PhD in Astronomy

Dissertation: "Dynamical and radiative modeling of Sagittarius A\*"

Advisor: Prof. Ramesh Narayan

2011, May

**Moscow Institute of Physics and Technology (MIPT)**, Dolgoprudny, Russia

Master of Applied Mathematics and Physics with Honors

Thesis: "Magnetized spherically symmetric flows"

Advisor: Prof. Vasily Beskin

2007, June

## ACADEMIC HONORS AND AWARDS

Hubble Fellowship

Rodger Doxsey AAS dissertation prize, runner-up

NASA Earth and Space Science Fellowship

Philip Putnam Chase Memorial Fellowship

Dynasty Foundation Fellowship

International Soros Science Education Program grant "Student-2005"

Russian Foundation for Basic Research (RFBR) Astronomy Fellowship

Best presentation at XLVII and XLVIII Scientific Conferences at MIPT

MIPT Physics Olympiad for Undergraduate Students

absolute winner (1<sup>st</sup> out of 2000 students), four times in a row

Fellowship of the Mayor of Leningradskaya region

Prometey Star, Awarded by the Cultural Figures and Scientists of Saint-Petersburg

for remarkable success in Science

Gold medal for Extraordinary Success in Studies

Candidate for the National Russian Team to International Physics Olympiad,

Winner of numerous Russian National Olympiads

in Physics, Mathematics, Chemistry, and Computer Science

2011-present

2011

2008-2011

2006-2008

2005-2006

2005

2004-2006

2004, 2005

2002-2005

2001

2001

2001

2000-2001

1997-2001

## PUBLICATIONS

1. **Shcherbakov R. V.**, Penna R. F., McKinney J. C., "Constraining the accretion flow in Sgr A\* by GR dynamical and polarized radiative modeling," **ApJ**, 2010+, submitted
2. Haas R., **Shcherbakov R. V.**, Bode T., Laguna P., "Tidal disruptions of white dwarfs from ultra-close encounters with intermediate mass spinning black holes," **ApJ**, 2012, accepted
3. Huang L., **Shcherbakov R. V.**, "Faraday conversion and rotation in uniformly magnetized relativistic plasmas," **MNRAS**, 2011, 416, pp. 2574- 2592
4. Kulkarni A., Penna R. F., **Shcherbakov R. V.**, et al., "Measuring Black Hole Spin by the Continuum-Fitting Method: Effect of Deviations from the Novikov-Thorne Disc Model," **MNRAS**, 2011, 414, pp. 1183-1194

5. **Shcherbakov R. V.**, Huang L., “General relativistic polarized radiative transfer: the interface between dynamics and observations,” **MNRAS**, 2011, 410, 1052-1063
6. **Shcherbakov R. V.**, Baganoff F. K., “Inflow-outflow model with conduction and self-consistent feeding for Sgr A\*,” **ApJ**, 2010, 718, pp. 504-509
7. **Shcherbakov R. V.**, “Dispersion of waves in relativistic plasmas with isotropic particle distributions,” **Physics of Plasmas**, 2009, 16, pp. 032104-032104-7
8. **Shcherbakov R. V.**, “Propagation effects in magnetized transrelativistic plasmas,” **ApJ**, 2008, 688, pp. 695-700
9. **Shcherbakov R. V.**, “Spherically symmetric accretion flows: minimal model with MHD turbulence,” **ApJS**, 2008, 177, pp. 493-514
10. **Shcherbakov R. V.**, “Region of anomalous compression under Bondi–Hoyle accretion,” **Astronomy Letters**, 2005, 31, pp. 591–597

### TALKS & COLLOQUIA

MIT, University of Maryland	2011
Princeton; Johns Hopkins University; University of Maryland	2010

### PROFESSIONAL MEMBERSHIPS/SERVICES

**Panel review:** NASA ATP Program

**Referee:** Astrophysical Journal, MNRAS, New Astronomy, Int. J. Physical Sciences

**Judge:** Chambliss Astronomy Achievement Student Award, 219-th AAS meeting

**Membership:** full AAS member, HEAD member

### CONFERENCE PRESENTATIONS & PROCEEDINGS

- “Ultra-close Tidal Disruptions of White Dwarfs by IMBHs” talk at “The Physics of Astronomical Transients”, Aspen, CO, January 21-27, 2011
- “Sgr A\*: energizing the surroundings across epochs” talk at “The emerging, multi-wavelength view of the Galactic Centre Environment”, Heidelberg, Germany, October 17-20, 2011  
/and/ at 219 AAS meeting, Austin, TX, USA, Jan 8-12, 2011
- “Flares from Disruptions of White Dwarfs by Intermediate Mass Black Holes” talk at 218 AAS meeting, Boston, MA, USA, May 23-26, 2011
- “Dynamical and Radiative Modeling of Sgr A\*” dissertation talk at 217 AAS meeting, Seattle, WA, USA, January 9-13, 2011
- “A novel method to find the spin of a black hole with radiatively inefficient accretion” talk, “The Ins and Outs of Black Holes,” Annapolis, MD, USA, November 15-17, 2010
- “Quiescent X-rays from Sgr A\* accretion flow: model fits observations” poster, “Accretion processes in X-rays: from white dwarfs to quasars,” Boston, MA, USA, July 13-15, 2010
- “Self-consistent modeling of Sgr A\* quiescent emission” contributed talk, “Probing strong gravity near black holes,” Prague, CZ, February 15-18, 2010
- “Unified accretion model for Sgr A\*” contributed talk at 215 AAS meeting, Washington, DC, USA, January 3-7, 2010
- “Inflow-outflow solution with stellar winds and conduction near Sgr A\*” contributed talk and paper in ASP proceedings, “Galactic Center workshop 2009,” Shanghai, China, October 19-23, 2009
- “Constraining the accretion flow in Sgr A\* by GR dynamical and radiative modeling” poster and paper in ASP proceedings, “GC workshop 2009,” Shanghai, China, October 19-23, 2009
- “Constraining the black hole parameters and the accretion flow in Sagittarius A\* by GR dynamical and radiative modeling” poster at 213 AAS meeting, Long Beach, USA, January 4-8, 2009
- “Self-consistent modeling of accretion with magneto hydrodynamic turbulence” poster at “Magnetic field generation in experiments, geophysics and astrophysics,” Santa Barbara, USA, July 14-18, 2008

- “Dynamics of magnetized spherical accretion flows” solicited talk and paper in AIP proceedings,  
 “Astrophysics of compact objects,” HuangShan, China, July 1-7, 2007  
 “Some new semi-analytical approaches to axially symmetric hydrodynamic flows” talk at “Scientific  
 conference”, MIPT, section of “Problems of physics and astrophysics,” November 26-27, 2005  
 “Region of anomalous compression in Bondi-Hoyle accretion” poster at “Physics of Neutron stars,” St.  
 Petersburg, Russia, June 27-29, 2005

### PUBLIC OUTREACH

- “Bizarre Eating Habits of the Black Hole in the Center of the Milky Way” public talk for amateur  
 astronomers at NOVAC, Fairfax, VA, USA, February 12, 2012  
 “Chandra X-rays the heart of the Milky Way” press conference at 215 AAS meeting, Washington, DC,  
 USA, January 3-7, 2010 + correspondent articles in popular science magazines  
 2011 AAS Membership Calendar, month of August

### NUMERICAL SKILLS & CODE DEVELOPMENT

- General relativistic polarized radiative transfer in C++ with OpenMP run on a supercomputer
- Fast exact evaluation of cyclo-synchrotron emissivities/absorptivities, Faraday rotation and Faraday  
 conversion coefficients in C++
- Geodesics integrator for Kerr black hole in C++
- Shooting and relaxation methods for multi-transonic accretion/ejection problems in Mathematica 7
- Expert in Mathematica 8 system
- Advanced C programming w/ OpenMP, MPI, basic CUDA programming

### RESEARCH INTERESTS

- **Dynamics:** Numerical GRMHD simulations, mean field theories, multi-transonic flows, models with  
 conduction, inflow-outflow solutions, tidal disruptions
- **Plasma physics:** plasma waves, plasma turbulence, general relativistic polarized radiative transfer,  
 collisionless effects, cyclo-synchrotron emissivities and propagation effects
- **Model fitting:** dynamical and radiative modeling of BH accretion in Sgr A\*, LLAGNs and jets; non-  
 traditional techniques to find the black hole spin

### TEACHING EXPERIENCE

#### Harvard University

- |   |              |
|---|--------------|
| Teaching Fellow, “High Energy Astrophysics” (R. Narayan, J. Grindlay) | 2009, Spring |
| Teaching Fellow, “Topics in Astrophysics” (R. Narayan)                | 2008, Spring |
| Organization of CfA Research Forum (J. Lee)                           | 2007         |
| Teaching Fellow, “Cosmic Connections” (D. Charbonneau)                | 2007, Fall   |

#### Russia

- |   |            |
|---|------------|
| Training the National Russian Team for International Junior Science Olympiad,<br>devising problem sets for qualifying competitions, conducting<br>qualifying competitions, holding lectures | 2005, 2006 |
| Training the National Russian Team for International Physics Olympiads,<br>conducting qualifying competitions, holding lectures   | 2001-2006  |
| Member of the Jury at Final (5 <sup>th</sup> ) stage of Russian Physics Olympiads   | 2003-2006  |
| Representative of the Central Methodical Committee of Russian Physics Olympiads<br>at Federal District (4 <sup>th</sup> ) stage of Physics Olympiads  | 2004, 2005 |
| Member of the Central Methodical Committee of Russian Physics Olympiads   | 2002-2006  |
| Individual tutor for physics and mathematics  | 2001-2006  |

**REFERENCES**

**Ramesh Narayan**

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Harvard University  
Astronomy Department  
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