Princeton, NJ — (773) 787-9856 — kaurov@ias.edu — kaurov.org

Alexander Kaurov

Also known as Sasha, Alexander Aleksandrovich Kaurov.

EXPERIENCE

The Institute for Advanced Study — *postdoc (member)*
Princeton, NJ, 2016 — PRESENT

- **AMIAS fellowship** 2016 — 2017
- *Paternity leave* 01 — 06/2017
- **Eric and Wendy Schmidt fellowship** 2017 — 2018
- **William D. Loughlin fellowship** 2018 — 2019
- **IBM Einstein fellowship** 2019 — 2020

The University of Chicago — *Research Assistant*
Chicago IL, 2012 — 2016

Fermilab — *Research Assistant*
Batavia IL, 2012 — 2013

- **Fermilab Fellowship in Theoretical Physics** 2012 — 2013

The University of Chicago — *Teaching Assistant*
Chicago IL, 2011 — 2012

- PHSC 12000 The Origin of Universe & How We Know
- PHSC 11900 Introductory astronomy course
- PHSC 13500 Chemistry — The Atmosphere

EDUCATION

The University of Chicago — *Ph.D.*
Chicago IL, 2011 — 2016

Astronomy & Astrophysics. Thesis: "Analytical and numerical modeling of the epoch of cosmic reionization."

- **McCormick Fellowship** 2011 — 2012

St. Petersburg State Polytechnic University — *B.Sc.*
St. Petersburg, Russia, 2007 — 2011

Nuclear astrophysics. Thesis: "Multidimensional numerical simulations of heat transfer in the crusts of neutron stars."

- **Russian Academy of Science fellowship** 2009 — 2011
  Central Astronomical Observatory of the Russian Academy of Sciences at Pulkovo, Russia
- **Ioffe Institute Fellowship** 2009 — 2010
  St. Petersburg State Polytechnic University, Russia

PUBLIC SERVICE

- The National Aeronautics and Space Administration (NASA) grant review panelist.
- Referee for Monthly Notices of the Royal Astronomical Society.

INTERESTS

Astrophysics, Cosmology, Astronomy.

Science communication & outreach.

SKILLS

Research, data analysis, programming, numerical simulations.

Course and curriculum development, teaching at school and college level.

Academic mentoring.

Application of Virtual and Augmented Reality in science communication and education.

REFERENCES

Academic:

Matias Zaldarriaga
matiasz@ias.edu

Nickolay Gnedin
gnedin@fnal.gov

Education and outreach:

Piet Hut
piet@ias.edu

Mark Subbarao
msubbarao@adlerplanetarium.org

OUTREACH AND SCIENCE COMMUNICATION PROJECTS

My interest in outreach and science communication is mostly focused on using immersive media.

- **Planetarium accessibility in the United States**
  Together with Mark SubbaRao (President, International Planetarium Society) and Vyacheslav Bazhenov (undergraduate student, Ekaterinburg State University) we studied the accessibility of the planetariums in the United States. Our finding help to understand who might benefit from the at-home immersive experiences: https://doi.org/10.22541/au.159724581.14747461

- **Science communication in the shared virtual worlds**
  I designed and supervised the development of various virtual world experiences. In collaboration with the Earth Life Science Institute (ELSI, Tokyo Institute of Technology) and the Japan Aerospace Exploration Agency (JAXA) we designed a virtual outreach lecture about the Hayabusa2 mission. We also created the first virtual world for Nautilus science magazine. More information: https://www.omniscope.org/virtual-worlds

- **Virtual Reality astronomy class**
  In collaboration with Jan Plass (NYU) I explore the meaningful possibilities of using the virtual reality technology (head mounted displays) to enhance certain aspects of science curriculum. Specifically we are working on developing curriculum and technology for the introductory astronomy lessons for 5th graders.

- **Curriculum development**
  The highlight of my outreach activities is the development of the Dark Matter high-school course that will be adopted for more than 50,000 students per year in Moscow, Russia.

MENTORING

Mentor network for young students in STEM

I am a co-founder of a mentoring program that connects undergraduate and graduate students from post-Soviet countries (Russia, Belarus, Ukraine and Kazakhstan) with mid-career scientists from all over the world. We generate around 60 mentor-mentee pairs each quarter from ~20 countries. Female-to-male ratio is 3/1 and 1/1 among the mentees and the mentors respectively.
More information: https://www.thesciencementors.com/en

Scientific advisor

The following undergraduate students from St. Petersburg State Polytechnic University (my home university) defended their B.Sc. theses under my supervision:

- Evgenii Chaikin (B.Sc., 2017), M.Sc. fellowship at the University of Bonn (Germany), Ph.D. student at Leiden Observatory (Netherlands),
- Nadezhda Tuberozova (B.Sc., 2018), graduate student at the University of Bonn (Germany),
- Ekaterina Leonova (B.Sc., 2019), M.Sc. fellowship at the University of Geneva (Switzerland).
- Vyacheslav Bazhenov (expected B.Sc. 2021)

Other mentees:

- Phoenix Akinlawon — 7th grade, remote mentoring in STEM and programming.

PUBLICATIONS

List of my publications and various metrics are available on ADS portal:
https://ui.adsabs.harvard.edu/search/p_=0&q=orcid%3A0000-0003-0255-1204

H-index (ADS): 12

Main research areas: Reionization, Cosmic Dawn, cosmological high-z 21 cm, Neutron stars, Highly Magnified Stars in Lensing Clusters, Large Scale Structure.

Italic names — the students I mentored.

Title	Authors	Year	Citations (ADS)
Current projects:			
Optical properties of the Resonant Drag Instabilities: Consequences for the variability of AGB-stars and R Cor Bor stars	Steinwandel, **Kaurov**, Hopkins	**2021**	
Episodes of Fe60 Accretion on the Solar System from a Single Supernova	*Chaikin*, **Kaurov**, Fields	**2021**	
The Back Reaction of Lyman Alpha Radiation onto the Gas	Murinov, **Kaurov**, Dai, Venumadhav	**2021**	
Cosmological Counts in Cells: Theory and Numerical Simulations	*Bazhenov*, Ivanov, **Kaurov**	**2021**	
Submitted and published:			
Planetarium commute accessibility in the United States of America 10.22541/au.159724581.14747461	**Kaurov**, *Bazhenov*, SubbaRao	**2020**	**0**
Asymmetric surface brightness structure of caustic crossing arc in SDSS J1226+2152: a case for dark matter substructure 2020MNRAS.495.3192D	Dai, **Kaurov**, Sharon and 6 more	**2020**	**4**
Research and Development for HI Intensity Mapping 2019BAAS...51g..71T	Timbie and 53 more	**2019**	**2**
Packed Ultra-wideband Mapping Array (PUMA): A Radio Telescope for Cosmology and Transients 2019BAAS...51g..53S	Slosar and 61 more	**2019**	**23**
Highly Magnified Stars in Lensing Clusters: New Evidence in a Galaxy Lensed by MACS J0416.1-2403 2019ApJ...880...58K	**Kaurov**, Dai, Venumadhav, Miralda-Escudé, Frye	**2019**	**17**
Probing the Time Domain with High Spatial Resolution 2019BAAS...51c.529B	Blakeslee, John and 19 more	**2019**	**0**
Non-perturbative probability distribution function for cosmological counts in cells 2019JCAP...03..009I	Ivanov, **Kaurov**, Sibiryakov	**2019**	**12**

Heating of the intergalactic medium by the cosmic microwave background during cosmic dawn 2018PhRvD..98j3513V	Venumadhav, Dai, **Kaurov**, Zaldarriaga	**2018**	**28**
Probing Dark Matter Subhalos in Galaxy Clusters Using Highly Magnified Stars 2018ApJ...867...24D	Dai, Venumadhav, **Kaurov**, Miralda-Escudé	**2018**	**13**
Implication of the Shape of the EDGES Signal for the 21 cm Power Spectrum 2018ApJ...864L..15K	**Kaurov**, Venumadhav, Dai, Zaldarriaga	**2018**	**19**
Observing Galaxy Mergers at the Epoch of Reionization 2018ApJ...853...81C	*Chaikin*, *Tyulneva*, **Kaurov**	**2018**	**1**
Stochasticity in the 21cm power spectrum at the epoch of reionization and cosmic dawn 2017arXiv170904353K	**Kaurov**	**2017**	**2**
Neutron stars with variable internal heaters 2017EL....11729001C	*Chaikin*, **Kaurov**, Kaminker, Yakovlev	**2017**	**0**
The Effects of Dark Matter Annihilation on Cosmic Reionization 2016ApJ...833..162K	**Kaurov**, Hooper, Gnedin	**2016**	**6**
On Improving Analytical Models of Cosmic Reionization for Matching Numerical Simulation 2016ApJ...831..198K	**Kaurov**	**2016**	**5**
Cosmic Reionization On Computers. Mean and Fluctuating Redshifted 21 cm Signal 2016ApJ...824..114K	**Kaurov**, Gnedin	**2016**	**10**
Energy Dissipation of Energetic Electrons in the Inhomogeneous Intergalactic Medium during the Epoch of Reionization 2016ApJ...824...97K	**Kaurov**	**2016**	**1**
Cosmic Reionization on Computers. III. The Clumping Factor 2015ApJ...810..154K	**Kaurov**, Gnedin	**2015**	**22**
Central Compact Objects in Kes 79 and RCW 103 as `Hidden' Magnetars with Crustal Activity 2015PASA...32...18P	Popov, **Kaurov**, Kaminker	**2015**	**12**
Cosmic Reionization on Computers. II. Reionization History and Its Back-reaction on Early Galaxies 2014ApJ...793...30G	Gnedin, **Kaurov**	**2014**	**68**
Thermal emission of neutron stars with internal heaters 2014MNRAS.442.3484K	Kaminker, **Kaurov**, Potekhin, Yakovlev	**2014**	**37**
Recombination Clumping Factor during Cosmic Reionization 2014ApJ...787..146K	**Kaurov**, Gnedin	**2014**	**25**
Effect of Halo Bias and Lyman Limit Systems on the History of Cosmic Reionization 2013ApJ...771...35K	**Kaurov**, Gnedin	**2013**	**20**