

# Hayk Hakobyan

PHD CANDIDATE · PRINCETON UNIVERSITY

☎ (+1) 609-375-7636 | ✉ hayk.hakobyan@gmail.com | 🏠 haykh.me | 📷 haykh

## Research interests

**Pulsar magnetospheres:** particle acceleration in the magnetospheric current sheet, high energy radiation, pair production in the outer magnetosphere.

**Black-hole accretion disk coronae:** hard state of X-ray binaries, generation, evolution and reconnection of magnetic loops in disk coronae.

**Magnetic reconnection:** acceleration mechanisms, effects of QED phenomena (radiation, pair production, Compton scattering) on reconnection dynamics, emission signatures of reconnecting systems.

## Skills

**Programming** C/C++, Fortran, python, CUDA

**Visualization** matplotlib (python), mayavi (python), d3js (javascript)

**Plasma simulations** Particle-in-cell (**Tristan-MP**, **Tristan-MP-v2**[\*]), force-free (**Tristan-ff**[\*], **CoffeeGPU**), MHD (**Athena**), hybrid (**Pegasus**)

[\*] marks codes I developed

## Education

### Princeton University

PH.D. IN ASTROPHYSICS

Princeton NJ, USA

2016 - present

### Princeton University

M.A. IN ASTROPHYSICS

Princeton NJ, USA

2016 - 2018

### Moscow Institute of Physics and Technology, Lebedev Physical Institute

M.S. IN THEORETICAL PHYSICS

Moscow, Russia

2014 - 2016

### Moscow Institute of Physics and Technology

B.S. IN PHYSICS (WITH HONORS)

Dolgoprudnyy, Russia

2010 - 2014

## Publications

### Secondary energization in compressing plasmoids during magnetic reconnection

Hakobyan, H., PETROPOULOU, M., SPITKOVSKY, A., SIRONI, L.

Submitted to ApJ (arXiv:2006.12530)

2020

### Effects of synchrotron cooling and pair production on collisionless relativistic reconnection

Hakobyan, H., PHILIPPOV, A., SPITKOVSKY, A.

ApJ 877, 53

2019

### On the mean profiles of radio pulsars - II. Reconstruction of complex pulsar light curves and other new propagation effects

Hakobyan, H., BESKIN, V., PHILIPPOV, A.

MNRAS 469, 2704

2017

### On the light-curve anomalies of radio pulsars.

Hakobyan, H., PHILIPPOV, A., BESKIN, V., GALISHNIKOVA, A., NOVOSELOV, E., RASHKOVETSKYI, M.

JPCS 012018

Sep. 2015 - May 2016

### The shapes of pulsar radio pulses in the plane of the sky

Hakobyan, H., BESKIN, V.

Astronomy Reports 58, 889

2014

## Talks and posters

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### Remote Thunch seminar

PRINCETON UNIVERSITY

Princeton, USA

Apr. 2020

### DPP 2019 (poster)

AMERICAN PHYSICAL SOCIETY

Ft. Lauderdale FL, USA

Nov. 2019

### Multiscale Phenomena in Plasma Astrophysics workshop

KAVLI INSTITUTE FOR THEORETICAL PHYSICS

Santa Barbara CA, USA

Oct. 2019

### Magnetospheres of Neutron Stars and Black Holes

NASA GODDARD SPACE FLIGHT CENTER

Greenbelt MD, USA

Jun. 2019

### Thunch seminar

PRINCETON UNIVERSITY

Princeton NJ, USA

Nov. 2018

### Eighth International Fermi Symposium (poster)

NASA

Baltimore MD, USA

Oct. 2018

### Workshop on Relativistic Plasma Astrophysics (poster)

PURDUE UNIVERSITY

West Lafayette IN, USA

May 2018

### Talks and posters at various international conferences in Russia

HIGH ENERGY ASTROPHYSICS (2013, 2014, 2015), INTERGALACTIC RADIOWAVE ASTRONOMY CONFERENCE (2014, 2015), NEUTRON STARS INTERNATIONAL CONFERENCE (2014)

Russia

2014 - 2015

## Teaching and mentorship

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### Co-advisor

SIMONS-NSBP SCHOLARS PROGRAM

Remote

Jul. 2020 - Aug. 2020

### Co-advisor

FOR ALISA GALISHNIKOVA (UNDERGRADUATE IN MIPT, NOW GRADUATE STUDENT AT PRINCETON), CO-ADVISED WITH VASILY BESKIN AND ALEXANDER PHILIPPOV

Remote

Sep. 2018 - May 2019

### Teaching assistant

AST 203 COURSE AT PRINCETON UNIVERSITY

Princeton NJ, USA

Feb. 2018 - May 2018

### Computer science teacher

INTEGRATION XXI (INTERNATIONAL BACCALAUREATE)

Moscow, Russia

Sep. 2015 - May 2016

### Private tutor

PHYSICS AND MATHEMATICS OF UNDERGRADUATE AND SCHOOL LEVEL

Moscow, Russia

Sep. 2014 - May 2016

## Community engagement

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2017-2018 **Organizer**, Thunch seminar in the Astrophysics Dept of Princeton

*Princeton NJ, USA*

2018+ **Referee**, for ApJ, MNRAS and JPP

*Remote*

2020+ **Member**, international team of experts of the Science Committee of Armenia

*Remote*

2014-2016 **Science reporter**, various pop-science and non-scientific magazines

*Russia*

2013-2015 **Organizer**, undergraduate physics seminar in the Moscow Institute of Physics and Technology

*Russia*