

# Rinat Tagirov

RESEARCH ASSOCIATE

Imperial College London, Blacket Laboratory, Level 10, Astrophysics Group, Prince Consort Road, London SW7 2AZ, UK

☎ (+44) 74-3640-1732 | ✉ tagirovrinat@gmail.com

## Education

### ETH Zürich (Swiss Federal Institute of Technology Zürich)

Zürich, Switzerland

DOCTOR OF SCIENCES

Sep. 2011 - Oct. 2016

- Thesis Title: Physical Understanding of Solar Irradiance in UV and Radio Wavelengths.
- Scientific Advisors: Dr. Alexander Shapiro, Prof. Dr. Werner Schmutz

### Saint-Petersburg State University

Saint-Petersburg, Russia

SPECIALIST DIPLOMA IN ASTRONOMY

Sep. 2006 - Jun. 2011

- Thesis Title: Physical Conditions in Molecular Clouds at High Redshifts.
- Scientific Advisor: Dr. Alexandre Ivanchik

## Skills

**Science** NLTE Radiative Transfer, Solar Irradiance Modeling

**Programming** Fortran, Python, Bash, LaTeX, IDL

**Languages** Russian, English, German (basic)

## Experience

### Imperial College London

London, UK

RESEARCH ASSOCIATE

Oct. 2016 — PRESENT

- Developed NESSY for its implementation in 1.5D solar irradiance calculations, which included:
  - implementation of mixed NLTE/LTE calculations in NESSY;
  - merging the ATLAS9 code with the NLTE block of NESSY.

### Physical-Meteorological Observatory Davos

Davos, Switzerland

PHD STUDENT

Sep. 2011 — Sep. 2016

- Implemented accelerated  $\Lambda$ -iterations in the stellar radiative transfer code NESSY.
- Improved a method for derivation of CLVs of solar brightness from solar eclipse observations.
- Applied this method to PREMOS/PICARDS solar eclipse data.
- Compared the derived CLVs to the ones calculated with NESSY in order to test 1D models of solar atmosphere.
- Applied NESSY to calculate and analyze the facular and spot contrasts.
- Used these contrasts to model the solar irradiance in UV and radio and analyze the correlation between the two.

### Ioffe Physical-Technical Institute

Saint-Petersburg, Russia

INTERNSHIP

Sep. 2010 - Jun. 2011

- Improved a method for calculating particle concentration in molecular clouds at high redshifts.
- Using this method together with observations of carbon atom fine-structure lines:
  - calculated the CMB temperature in two molecular clouds associated with quasars J0812+3208 and Q1232+082;
  - calculated the hydrogen molecular fraction in these clouds.
- Estimated the UV radiation background and electron concentration in their inner parts.

## Teaching

### Faculty of Natural Sciences

Imperial College London

YEAR 1 PROJECT SUPERVISOR

Jan. 2017 — May 2017

- Was in charge of two first year students who worked as a pair.
- Their project was concerned with the identification of active regions (spots and faculae) on the solar surface.
- Images from HMI/SDO were analysed using Python image processing tools.

### Department of Mechanical Engineering

ETH Zürich

LABORATORY PRACTICUM ASSISTANT

Sep. 2013 — Dec. 2014

- Conducted the laboratory experiment practice instruction for about 25 students each semester.
- Marked the lab experiment reports.

## Department of Physics

PHYSICS III COURSE ASSISTANT

- Conducted exercise classes on optics, statistical mechanics and quantum mechanics for a group of about 20 students.
- Marked the exercise sheets.

ETH Zürich

Sep. 2012 — Feb. 2013

## Department of Physics

PHYSICS II COURSE ASSISTANT

- Conducted exercise classes on classical mechanics for a group of about 20 students.
- Marked the exercise sheets.
- Shared the role with one more assistant.

ETH Zürich

Jan. 2012 — May 2012

## Publications

---

- R. V. Tagirov, A. I. Shapiro and W. Schmutz  
*NESSY: NLTE spectral synthesis code for solar and stellar atmospheres*  
Astronomy & Astrophysics, 603, A27  
2017
- G. Thuillier, P. Zhu, A. I. Shapiro, S. Sofia, R. V. Tagirov, M. van Ruymbeke and W. Schmutz  
*Solar disk radius determined from observations made during eclipses by bolometric and photometric instruments on-board the PICARD satellite*  
Astronomy & Astrophysics, 603, A28
- J. Gröbner, S. Kazadzis, N. Kouremeti, L. Doppler, R. V. Tagirov, and A. I. Shapiro  
*Spectral solar variations during the eclipse of March 20<sup>th</sup> 2015 at two European sites*  
American Institute of Physics Conference Proceedings, 1810, 1
- G. Cessateur, ..., R. V. Tagirov, et al.  
*Solar irradiance observations with PREMOS filter radiometers on the PICARD mission: In-flight performance and data release*  
Astronomy & Astrophysics, 588, A126  
2016
- A. I. Shapiro, S. K. Solanki, N. A. Krivova, R. V. Tagirov and W. K. Schmutz  
*The role of the Fraunhofer lines in solar brightness variability*  
Astronomy & Astrophysics, 581, A116  
2015

## Presentations

---

### Sun-climate group seminar of Max-Planck-Institute for Solar System Research

MPS, Göttingen, Germany

INVITED TALK

Nov. 2015

*Fixing  $\Lambda$ -Iterations in the NESSY code*

### Solar Metrology: Needs and Methods

Paris, France

CONFERENCE POSTER

Oct. 2014

*Fast NLTE radiative transfer numerical scheme for solar spectrum modeling*

### Davos Atmosphere and Cryosphere Assembly (DACA-13)

Davos, Switzerland

CONFERENCE POSTER

Jul. 2013

*Analysis of the solar eclipses observed with PREMOS/PICARD*

### 8<sup>th</sup> European Space Weather Week

Namur, Belgium

CONFERENCE SPLINTER-SESSION TALK

Nov. 2011

*Analysis of the solar eclipses observed with PREMOS/PICARD*

## References

---

### Dr. Yvonne Unruh

SENIOR SCIENTIST, LECTURER

Imperial College London

Blackett Laboratory, Astrophysics Group

Prince Consort Road, London SW7 2AZ, UK

E-mail: [y.unruh@imperial.ac.uk](mailto:y.unruh@imperial.ac.uk)

Tel: (+44) 20-7594-7560

**Dr. Alexander Shapiro**

SENIOR SCIENTIST

Max-Planck Institute for Solar System Research  
Department Sun and Heliosphere  
Justus-von-Liebig-Weg 3, Göttingen 37077, Germany  
E-mail: **shapiroa@mps.mpg.de**  
Tel: (+49) 551-384-979-431

**Prof. Dr. Werner Schmutz**

DIRECTOR

Physical-Meteorological Observatory Davos  
Dorfstrasse 33, Davos Dorf 7260, Switzerland  
E-mail: **werner.schmutz@pmo.dwc.ch**  
Tel: (+41) 58-467-5145