



Centrum Fizyki Teoretycznej
Polskiej Akademii Nauk

Aleja Lotników 32/46, 02-668 Warszawa

Tel. (+48 22) 847 09 20, Fax/Tel: (+48 22) 843 13 69

E-mail: cft@cft.edu.pl, NIP: 525-000-92-81, REGON: 000844815

FORM FOR EMPLOYERS

INSTITUTION Center for Theoretical Physics, Polish Academy of Sciences.....

CITYWarsaw.....

POSITIONPhD student fellowship.....

DISCIPLINEphysics.....

POSTED09.04.2024.....

EXPIRES ...31.05.2024.....

WEBSITE <http://www.cft.edu.pl>

KEY WORDS black holes, neutron stars, hydrodynamics, high energy radiation

DESCRIPTION (field, expectations, comments):

The Director of the Center for Theoretical Physics PAS invites applications for **PhD student fellowship** at the CTP PAS, financed from the project MAESTRO 15 "*Dynamics of processes around compact stars*" funded by National Science Center (grant registration number: UMO- 2023/50/A/ST9/00527). PI of the project is Prof. dr hab. Agnieszka Janiuk.

The aim of the project is to study accretion flows around compact stars, such as black holes and neutron stars. Using numerical computer simulations, a model of the accretion disk instability driven by a dominant radiation pressure (RPI), will be studied. It has been shown that in RPI, a self-regulated process leads to cyclic oscillations of disk temperature, density and luminosity in the unstable parts, which can be modeled numerically. The development of the dynamical model specifically addressed to accreting stellar mass black holes (Janiuk et al. 2002) was motivated by discovery of the seminal source, microquasar GRS 1915+105. Later on, subsequently found other microquasars have proven to be subject to RPI (Sukova et al. 2016). In the context of supermassive black holes, statistical studies were used (Czerny et al. 2009) to shed light on the problem. Most recently, however, a new class of sources called changing-look (CL) AGN are observed, where the tentative timescales of their eruptions are suggesting the RPI in action (Miniutti et al. 2019). Most recently, neutron stars have been invoked in this context as well (Vincentelli et al. 2023).

The scope of work of the successful Candidate within the project will be on development of numerical simulations and analysis of observational data



Centrum Fizyki Teoretycznej
Polskiej Akademii Nauk

Aleja Lotników 32/46, 02-668 Warszawa

Tel. (+48 22) 847 09 20, Fax/Tel: (+48 22) 843 13 69

E-mail: cft@cft.edu.pl, NIP: 525-000-92-81, REGON: 000844815

related to the radiation pressure instability driven flares in accreting compact stars.

We expect the candidates to have:

- Master's degree in physics or astronomy,
- Good theoretical and numerical background.
- interest in fluid dynamics and magnetohydrodynamics,
- independence and creativity in solving problems.
- knowledge of astronomical data reduction and analysis (X-ray spectroscopy and polarimetry) will be a plus.

The application must include:

1. The scientific CV, including the progress in the university studies, scientific achievements (publications, participation in research projects and conferences), with the clause *"I agree to the processing of my personal data contained in the application documents for the purposes necessary for the implementation of the process recruitment by the doctoral school GeoPlanet"*.
2. Cover letter.
3. A copy of the master's degree diploma, or a statement from the Candidate's MSc Advisor about the planned date of diploma obtaining
4. Copies of documents confirming scientific or professional achievements.
5. Two letters of recommendation from a researcher with at least a PhD degree, concerning the candidate and his/her current scientific activity.
6. Application for admission to the Geoplanet doctoral school (Attachment No. 1).

The application should be submitted electronically **between 2024-04-03 and 2024-05-31**. In the e-mail's title please add the **reference number: AJ/04/2024**. Selected Candidates will be invited to an interview, to be held in the 2nd week of June (06-10 to 06-14).

The scholarship will be awarded in accordance with the applicable law in Poland and the regulations of the National Science Centre (NCN), amounting to approximately 4700 PLN net per month.

The competition will be settled by 2024-06-30. Candidates will be informed electronically on the results of the competition. Admission to the GeoPlanet Doctoral School and the **beginning of the scholarship are scheduled for 2024-10-01**.

Link to information on the GeoPlanet Doctoral School:

<https://geoplanetschool.camk.edu.pl/doctoral-school/about-us/>

Link to the Project Supervisor's website:

<https://ajaniuk.cft.edu.pl/>

If you have any questions, please send an e-mail to: agnes@cft.edu.pl.



Centrum Fizyki Teoretycznej
Polskiej Akademii Nauk

Aleja Lotników 32/46, 02-668 Warszawa

Tel. (+48 22) 847 09 20, Fax/Tel: (+48 22) 843 13 69

E-mail: cft@cft.edu.pl, NIP: 525-000-92-81, REGON: 000844815

Attachment 1

**APPLICATION FOR ENROLLMENT
in the GeoPlanet Doctoral School**

1. Given name of the candidate:
2. Surname of the candidate:
3. Indicating the main research topic/theme and additional topics/themes - not more than 2 (if applicable):
4. E-mail address:
5. Correspondence address:
6. Subject of the Master's Thesis, the supervisor:
7. Level of English:

Hereby I move for my enrollment in the GeoPlanet Doctoral School in

.....

I declare that I read the Regulations on the Recruitment to the GeoPlanet Doctoral School,

I agree to the processing of my personal data by

..... *(please provide the name of the Institute)* for realizing the recruitment process (pursuant with the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (Journal of Laws, EU.L as of 2016 No 119, page 1) – hereinafter: GDPR, and the domestic laws issued on its basis in the scope of personal data protection.

date:

.....

(signature)