



Center for Theoretical Physics PAS

Al. Lotników 32/46, 02-668 Warsaw, Poland

Phone: (+48 22) 847 09 20, Fax: (+48 22) 843 13 69

Email: cft@cft.edu.pl

Warsaw, 26 February 2018

PhD position at Center for Theoretical Physics

The Director of the Center for Theoretical Physics PAS invites applications for **PhD position** at the CTP PAS, financed from the project “**Constraints on the dark energy properties based on observations of active galaxies**”, National Science Center (NCN), decision Nr DEC-2017/26/A/ST9/00756, project No. 2017/26/A/ST9/00756 (MAESTRO 9). PI of the project is Prof. Bożena Czerny. The PhD student will be enlisted as a participant of the PhD Program of the Nicolaus Copernicus Astronomical Center PAS (CAMK PAN) but will have an individual program under supervision of B. Czerny. The PhD subject will be related to the topic of the project. The student will receive a stipend of 4500 zł/month, for the maximum period of 4 years.

At the time of application the candidates should either have a MSc degree, or will obtain it before signing the contract. We search for candidates interested in the research in the domain of **astrophysics**. Candidates with previous experience in programming are particularly welcome. The specific topic of the study would be the radiative transfer in the dusty Broad Line Region. Active Galactic Nuclei, including quasars can be used as new cosmological tool, complementary to the Supernovae Ia.

The idea is based on the determination of the quasar absolute luminosity from the time delay between the variable continuum and responding Broad Emission Lines. According to our model (Czerny & Hryniewicz 2011), these strong emission lines form in the outer part of accretion disk where dusty atmosphere is subject of strong radiation pressure and the matter is easily lifted high above the disk. Thus combining the knowledge where the dust forms, and measuring this distance from the time delay,

we can use quasars for cosmology. However, the Broad Line Region is extended, and for more accurate measurements we need to improve the theoretical knowledge of the structure of this

region. The goal is to calculate the motion of the material under the effect of the radiation pressure, including the dust opacity, to determine the 3-D picture of the matter distribution and its dynamics, and finally to calculate the expected time delay distribution from the model, and to obtain the shapes of emission lines. Predictions can be tested using the well studied sources. More details about the project can be found at the web site of CTP (link below).

Candidates should submit before **March 25, 2018**, the following documents to the Secretariat of the Center, Al. Lotników 32/46, Warsaw (or pdf files by e-mail to cft@cft.edu.pl):

1. The scientific CV, including the list of major scientific achievements, list of publications, participation in research projects and conferences, and the document must contain a statement: "I consent to the processing of my personal data for the needs of the recruitment process (in accordance with the Law dated 29.08.97 on the protection of personal data (Journal of Laws, No. 101, item 926)".
2. Short motivation letter
3. Transcript of grades (Bachelor and Master degree courses)
4. Personal questionnaire form (should be downloaded from CTP web site)
5. At least one recommendation letter, including the letter from the MSc advisor
6. Certified copy of the MSc diploma or the letter from the supervisor about the prospects for completion of the Thesis before the beginning of the employment
7. Work plan for the first year. Candidates should contact Prof. B. Czerny (bcz@cft.edu.pl) to obtain more details on the proposal and to set a plan for the work during the first year of their studies.

Documents can be sent by e-mail to cft@cft.edu.pl. Questions about the project and employment conditions should be sent directly to Prof. Bożena Czerny (bcz@cft.edu.pl).

Review of applications is expected before May 30, 2018. Applicants will be informed about the results by e-mail.

Link to the project page: <http://www.cft.edu.pl/users/czerny/en>

Link to the PhD studies at CAMK PAN: <https://www.camk.edu.pl/en/phd/>

Dyrektor
Centrum Fizyki Teoretycznej PAN
[Signature]
dr hab. Lech Mankiewicz