Aspects of X-ray data analysis for accreting compact objects: theory and results

- ***COURSE SYLLABUS***

1.	**Course title:** *Aspects of X-ray data analysis for accreting compact objects: theory and results*	
2.	**Lecturer:** *Piotr Życki, CAMK PAN*	
3.	**Field, type and level of studies, year of study:** *astrophysics, high-energy astrophysics, all years of study*	
4.	**Course character:** *monographic lecture*	
5.	**Teaching method:** *Traditional, in-person*	
6.	**Language:**	*English*
7.	**Course type and number of hours:** *Lecture 30h*	
8.	**Estimated load of student's independent work:**	*20h*
9.	**Total workload and number of ECTS points:**	*50 h, 3 ECTS*
10.	**Short description and main focus of the course:** *The idea of this course is to present the fundamental physical and mathematical concepts relevant to the X-ray emission from accreting compact objects and to demonstrate their applications to data, based on published papers. I am going to discuss the physical processes leading to X-ray emission, present some computational methods and introduce specific tools and software used to compute the emission and apply to modelling the data. Specifically, I will discuss the spectral and timing properties of the X-ray emission and then I am going to show how data analysis results in revealing the physical and geometrical properties of the accretion flows in the considered objects.*	
11.	**References:** *"Radiative Processes in Astrophysics", Rybicki & Lightman* *Specific original research papers discussed during the lectures*	
12.	**Prerequisites:** *MSc level physics and astronomy*	

13.	**Educational outcomes:**	**PQF level 8 codes:**
	Knowledge: *Knowing and understanding the basic physical processes responsible for high-energy emission from the central regions of accreting compact objects. Understanding how the observed properties put constraints on specific models or ideas*	*P8S_WG*
	Practical Skills: *Ability to create new or use existing software tools to compute expected properties of the radiation, and to compare them with the data*	*P8S_UW*
	Social Skills: *ability to explain the process of inferring knowledge on the discussed subject, including such aspects as uncertainty of the obtained results, or non-uniqueness of solutions*	*P8S_KK*
14.	**Evaluation of the educational outcomes:**	
	A mini-project related to the presented subjects or oral exam	
15.	**Criteria to complete the course:**	
	at least 80% attendance && (the project || the exam)	
16.	**Contact with the lecturer:**	
	ptz@camk.edu.pl	