Physical optics and application to long-baseline interferometry
- COURSE SYLLABUS

1.	**Course title:** *Physical optics and application to long-baseline interferometry*	
2.	**Lecturer:** *Dr. Vincent Hocdé*	
3.	**Field, type and level of studies, year of study:** *astronomy, physical optics, all years of study*	
4.	**Course character:** *monographic lecture*	
5.	**Teaching method:** *traditional or on-line*	
6.	**Language:**	*English*
7.	**Course type and number of hours:** *lecture, 30h*	
8.	**Estimated load of student's independent work:**	*10h*
9.	**Total workload and number of ECTS points:**	*eg., 40h, 3 ECTS*
10.	**Short description and main focus of the course:** *This course introduces the principles of long-baseline optica/infrared interferometry, covering physical optics principles and providing practical skills for preparing observations for VLTI and writing proposals. The students will familiarize with different aspects of optical physics, atmospheric turbulence and preparing interferometric observations.* 1. *Introduction : Active interferometers in the world and major discoveries* 2. *Electromagnetic waves and propagation of light* 3. *Interferences and Diffraction (mathematical description).* 4. *Young's double slit experiment (and quantum interpretation).* 5. *Van Cittert-Zernike theorem in practice : binary stars, UD angular diameter* 6. *History of optical interferometry* 7. *Principles of atmospheric turbulence* 8. *Overview of GRAVITY, MATISSE and PIONIER VLTI instruments* 9. *Preparing observations at VLTI : writting and evaluating a proposal, create interferometric model, prepare observation blocks, fitting models to observations*	
11.	**References:** *https://www.jmmc.fr/english/tools/proposal-preparation/aspro/* *Andreas Glindemann, Principles of Stellar Interferometry, Springer Berlin, Heidelberg*	

12.	**Prerequisites:** *basic level of Python required, basics in astronomy and/or physics.*	
13.	**Educational outcomes:**	**PQF level 8 codes:**
	Knowledge: *The student will have theoretical and practical understanding of physical optics applied to interferometry. Historical knowledge will be also acquired. The theoretical knowledge includes the derivation of interferences pattern depending on the observed objects or the aperturę slit.*	*P8S_WG*
	Practical Skills: *The student will be able to understand and prepare interferometric observations for their project.*	*P8S_UW, P8S_UO, P8S_UU*
	Social Skills: *Team working to create a proposal, and also evaluate them.*	*P8S_KK, P8S_KO*
14.	**Evaluation of the educational outcomes:** *written exam, homework assignments*	
15.	**Criteria to complete the course:** *final grade depends on the evaluation of the exam (60%) and homework assignement (40%)*	
16.	**Contact with the lecturer:** *vhocde@camk.edu.pl*	