MASTER

Physique fondamentale et applications

SCIENCES SORBONNE UNIVERSITÉ

M1 – Course description MU4PYA09

Course:	**Code Apogée UE : MU4PYA09**	
	Nombre d'ECTS : 6	
Course coordinators:	Sorbonne Université Name : **DAIGNE, Frédéric** Adress : Institut d'Astrophysique de Paris (IAP), 98 bis boulevard Arago, 75014 Paris Phone : +33 1 44 32 81 89 Email : daigne@iap.fr	Université de Paris Name : **NERONOV, Andrii** Adress : Astroparticule et Cosmologie (APC), Université Paris Diderot, bât. Condorcet, 10 rue Alice Domon et Léonie Duquet, 75205 Paris Cedex 13 Phone : +33 1 57 27 93 71 Email : andrii.neronov@apc.in2p3.fr
Number of hours:	60h (lectures + tutorials)	
Semester :	**S2**	
Lecture localization:	Campus Jussieu (Sorbonne Université) – Université de Paris	
Laboratories:	no	
Objectives:	This course offers an introduction to astrophysics and cosmology. The main observational methods for detecting the stars and other astrophysical systems and for measuring their physical properties are presented. The emphasis is then put on the physical interpretation of these observations by taking advantage of the different fields of physics studied up to master 1.	
Prerequisites:	General Physics: classical mechanics, thermodynamics, basic fluid mechanics, quantum physics, statistical physics.	
Topics/program:	The course is organized in 6 chapters: 1. Observational tools and astronomical observation windows (A. Neronov) 2. Stars (F. Daigne) 3. Planetary Systems (F. Daigne) 4. Interstellar Medium (F. Daigne) 5. Galaxies (A. Neronov) 6. Cosmology (A. Neronov)	
Competences expected after the course:	- Basic knowledge about the structures found in the Universe at all scales, from the Solar System to the whole Universe. - Understanding of the main observational tools to measure the properties of stars and other astrophysical systems (distance, mass, size, temperature, chemical composition, etc.). - Understanding the complementarity of observations at different wavelengths or using different messengers (e.g. light, neutrinos, gravitational waves, cosmic rays). - Capacity to apply the already known physics to model complex systems such as stars, planetary systems, galaxies (at least a simple model…). - Cosmology: understanding of the key observations on which modern cosmology is based. Introduction to the laws governing the structure and evolution of the Universe.	
Bibliography:	Longair, "High-Energy Astrophysics", Cambridge University Press (Third Edition, mainly Part I: Astronomical Background, chapters 2,3,4) Maoz, "Astrophysics in a nutshell", Princeton University Press	
Evaluation :	Short test at mid-semester Written exam at the end of the semester	
Barèmes (Apogée) :	Ecrit : 100 /100	