Ph.D. Course in Astrophysics and Cosmology

Academic Year 2021-2022

	Credits
I TERM	
Introduction to General Relativity , Antonio Lanza, lanza@sissa.it, 14 Lectures, 3.5 credits (compulsory)	3,5
High Energy Astrophysics , Anna Lisa Celotti, celotti@sissa.it, 8 lectures, 2 credits (compulsory)	2
Cosmology , Luigi Danese, danese@sissa.it, 14 lectures, 3.5 credits (compulsory)	3,5
Radiative Processes in Astrophysics , Francesca Perrotta, perrotta@sissa.it, 8 lectures, 2 credits (compulsory)	2
Computational Physics , Riccardo Valdarnini, valda@sissa.it, 8 lectures, 2 credits (compulsory)	2
Galaxy Formation and Evolution , Andrea Lapi, lapi@sissa.it, 16 lectures, 4 credits (compulsory)	3,5
Stellar Structure and Evolution , Alessandro Bressan, sbressan@sissa.it, 14 lectures, 3.5 credits (compulsory)	3,5
Statistical Modeling and Inference, Nicoletta Krachmalnicoff, nkrach@sissa.it,12 lectures, 3 credits (compulsory)	3
II TERM	**23**
Dark Matter , Paolo Salucci, salucci@sissa.it, 12 lectures, 3 credits	3
B-modes in CMB polarization , Davide Poletti, davide.poletti@unimib.it, 4 lectures, 1 credit	1
Advanced GR , Stefano Liberati, liberati@sissa.it, 18 lectures, 4.5 credits	4,5
Early Universe , Sabino Matarrese, matarrese@pd.infn.it, 4 lectures, 1 credit	1
Large Scale Structure , Riccardo Valdarnini, valda@sissa.it, 4 lectures, 1 credit	1
Structure formation , Matteo Viel, viel@sissa.it, 12 lectures, 3 credits	3
Linear Cosmological Perturbations & CMB anisotropies , Carlo Baccigalupi, bacci@sissa.it, 12 lectures, 3 credits	3
Data Analysis in Astrophysics , Giancarlo Ghirlanda, giancarlo.ghirlanda@inaf.it, 2 lectures, 0.5 credits	0,5
Inter-Galactic Medium , Stefano Cristiani, stefano.cristiani@oats.inaf.it, 6 lectures, 1.5 credits	1,5
Gravitational Waves , Enrico Barausse, barausse@sissa.it, 12 lectures, 3 credits	3
III TERM	**21,5**
Compact objects , Ilia Musco and John Miller, ilia.musco@uniroma1.it and john.miller@physics.ox.ac.uk, 8 lectures, 2 credits	2
Gamma Ray Bursts and Cosmic Rays , Lara Nava, lara.nava@inaf.it, 8 lectures, 2 credits	2
Star Dynamics: Explosive NucleoSynthesis , Marco Limongi, marco.limongi@inaf.it, 4 lectures, 1 credit	1
(Sub)mm and Radio Astronomy , Marcella Massardi, massardi@ira.inaf.it, 8 lectures, 2 credits	2
Astrobiology , Giovanni Vladilo, vladilo@oats.inaf.it, 8 lectures, 2 credits	2
Binary Stars: Birth, Life and Death, Mario Spera, mario.spera@live.it, 12 lectures, 3 credits	3
Inflation and Dark Energy , Paolo Creminelli & Mehrdad Mirbabayi, creminel@ictp.it & mirbabayi@ictp.it, 16 lectures, 4 credits	4
Artificial Neural Networks , Nicoletta Krachmalnicoff, nkrach@sissa.it, 4 lectures, 1 credit	1
	17
Monographic lectures (Massardi, Boco, Ronconi, Masini) + APC brainstorming = 0.5 credits	0,5
	62 **for II year admission > 37 credits**

	Room 135			Room 135
Date/Time	**08:30-10:00**	**10:00-11:30**	**11:30-13:00**	**Afternoon (time as specified)**
1-ott-21				
2-ott-21				
3-ott-21				
4-ott-21	**APC Ph.D. Defence: Gauri SHARMA h9-10:30**		**APC Welcome Meeting**	Stats Mod. & Inf. 1 - h14-15:30
5-ott-21	Intro to GR 1		Stellar Structure and Evolution 1	
6-ott-21		Galaxy Formation and Evolution 1	Cosmology 1	Stats Mod. & Inf. 2 - h14-15:30
7-ott-21	Intro to GR 2	Galaxy Formation and Evolution 2	Stellar Structure and Evolution 2	
8-ott-21				Stats Mod. & Inf. 3 - h14-15:30
9-ott-21				
10-ott-21				
11-ott-21		**APC Ph.D. Defence: Lara PANTONI h11-12:30**		Stats Mod. & Inf. 4 - h14-15:30
12-ott-21	Intro to GR 3	Galaxy Formation and Evolution 3	Stellar Structure and Evolution 3	
13-ott-21	Radiative Processes 1	Computational Physics 1	Cosmology 2	Stats Mod. & Inf. 5 - h14-15:30
14-ott-21	Intro to GR 4	Galaxy Formation and Evolution 4	Stellar Structure and Evolution 4	
15-ott-21				Stats Mod. & Inf. 6 - h14-15:30
16-ott-21				
17-ott-21				
18-ott-21		**APC Ph.D. Defence: Lumen BOCO h11-12:30**		Stats Mod. & Inf. 7 - h14-15:30
19-ott-21	Intro to GR 5	Galaxy Formation and Evolution 5	Stellar Structure and Evolution 5	
20-ott-21	Radiative Processes 2	Computational Physics 2	Cosmology 3	Stats Mod. & Inf. 8 - h14-15:30
21-ott-21	Intro to GR 6	Galaxy Formation and Evolution 6	Stellar Structure and Evolution 6	
22-ott-21				Stats Mod. & Inf. 9 - h14-15:30
23-ott-21				
24-ott-21				
25-ott-21	**APC Ph.D. Defence: Hasti KHORAMINEZHAD h9-10:30**			Stats Mod. & Inf. 10 - h14-15:30
26-ott-21	Intro to GR 7	Galaxy Formation and Evolution 7	Stellar Structure and Evolution 7	
27-ott-21	Radiative Processes 3	Computational Physics 3	Cosmology 4	Stats Mod. & Inf. 11 - h14-15:30
28-ott-21	Intro to GR 8	Galaxy Formation and Evolution 8	Stellar Structure and Evolution 8	
29-ott-21				Stats Mod. & Inf. 12 - h14-15:30
30-ott-21				
31-ott-21				
1-nov-21				
2-nov-21				
3-nov-21				
4-nov-21	Intro to GR 9	Galaxy Formation and Evolution 9	Stellar Structure and Evolution 9	
5-nov-21	Radiative Processes 4	Computational Physics 4	Cosmology 5	
6-nov-21				
7-nov-21				
8-nov-21				
9-nov-21	Intro to GR 10	Galaxy Formation and Evolution 10	Stellar Structure and Evolution 10	
10-nov-21	Radiative Processes 5	Computational Physics 5	Cosmology 6	
11-nov-21	Intro to GR 11	Galaxy Formation and Evolution 11	Stellar Structure and Evolution 11	
12-nov-21				
13-nov-21				
14-nov-21				
15-nov-21				
16-nov-21	Intro to GR 12	Galaxy Formation and Evolution 12	Stellar Structure and Evolution 12	
17-nov-21	**SISSA Opening Cerimony**			
18-nov-21	Intro to GR 13	Galaxy Formation and Evolution 13		
19-nov-21	Radiative Processes 6	Computational Physics 6	Cosmology 7	
20-nov-21				
21-nov-21				
22-nov-21	Intro to GR 14	Galaxy Formation and Evolution 14		
23-nov-21	Intro tu submm/radio astronomy (Massardi)	High-Energy Astrophysics 1	Computational Physics 7	
24-nov-21	Radiative Processes 7	High-Energy Astrophysics 2	Cosmology 8	
25-nov-21	Intro tu submm/radio astronomy (Massardi)	Galaxy Formation and Evolution 15	**APC Orientation Meeting**	
26-nov-21				
27-nov-21				
28-nov-21				
29-nov-21	Radiative Processes 8	Galaxy Formation and Evolution 16	Computational Physics 8	
30-nov-21	Designing effective talks and papers (Boco)	High-Energy Astrophysics 3	Cosmology 9	
1-dic-21	Designing effective talks and papers (Boco)	High-Energy Astrophysics 4	Cosmology 10	High-Energy Astrophysics 5 - h14-15:30
2-dic-21		Stellar Structure and Evolution 13	Stellar Structure and Evolution 14	
3-dic-21				
4-dic-21				
5-dic-21				
6-dic-21	Best practices for writing a code (Ronconi)		Cosmology 11	
7-dic-21	Best practices for writing a code (Ronconi)		Cosmology 12	
8-dic-21				
9-dic-21				

10-dic-21				
11-dic-21				
12-dic-21				
13-dic-21		High-Energy Astrophysics 6	High-Energy Astrophysics 7	
14-dic-21	AGN evolution and cosmic backgrounds (Masini)		Cosmology 13	
15-dic-21	AGN evolution and cosmic backgrounds (Masini)	High-Energy Astrophysics 8	Cosmology 14	
16-dic-21		**APC Brainstorming h10-13 room 128/129 + Big Meeting Room 7th floor**		
17-dic-21				
18-dic-21				
19-dic-21				
20-dic-21				
21-dic-21				
22-dic-21				
23-dic-21				
24-dic-21				
25-dic-21				
26-dic-21				
27-dic-21				
28-dic-21				
29-dic-21				
30-dic-21				
31-dic-21	**END OF I TERM**			
1-gen-22				
2-gen-22				
3-gen-22				
4-gen-22				
5-gen-22				
6-gen-22				
7-gen-22				
8-gen-22				
9-gen-22				
10-gen-22	Relativistic jet formation and dynamics (Salafia)	Early Universe 1	Lin. Cosm. Pert. 1	
11-gen-22	Relativistic jet formation and dynamics (Salafia)	Early Universe 2		
12-gen-22		Early Universe 3	Lin. Cosm. Pert. 2	
13-gen-22		Early Universe 4	Advanced GR 1	
14-gen-22				
15-gen-22				
16-gen-22				
17-gen-22	Dark Matter 1		Lin. Cosm. Pert. 3	Gravitational Waves 1 - h16-17:30
18-gen-22			Advanced GR 2	Gravitational Waves 2 - h16-17:30
19-gen-22	Dark Matter 2		Lin. Cosm. Pert. 4	Gravitational Waves 3 - h16-17:30
20-gen-22			Advanced GR 3	Gravitational Waves 4 - h16-17:30
21-gen-22				
22-gen-22				
23-gen-22				
24-gen-22	Dark Matter 3		Lin. Cosm. Pert. 5	Gravitational Waves 5 - h16-17:30
25-gen-22			Advanced GR 4	Gravitational Waves 6 - h16-17:30
26-gen-22	Dark Matter 4		Lin. Cosm. Pert. 6	Gravitational Waves 7 - h16-17:30
27-gen-22			Advanced GR 5	Gravitational Waves 8 - h16-17:30
28-gen-22				
29-gen-22				
30-gen-22				
31-gen-22	Dark Matter 5		Lin. Cosm. Pert. 7	Gravitational Waves 9 - h16-17:30
1-feb-22			Advanced GR 6	Gravitational Waves 10 - h16-17:30
2-feb-22	Dark Matter 6		Lin. Cosm. Pert. 8	Gravitational Waves 11 - h16-17:30
3-feb-22			Advanced GR 7	Gravitational Waves 12 - h16-17:30
4-feb-22				
5-feb-22				
6-feb-22				
7-feb-22	Dark Matter 7		Lin. Cosm. Pert. 9	
8-feb-22		Large Scale Structure 1	Advanced GR 8	
9-feb-22	Dark Matter 8		Lin. Cosm. Pert. 10	
10-feb-22			Advanced GR 9	
11-feb-22				
12-feb-22				
13-feb-22				
14-feb-22	Dark Matter 9		Lin. Cosm. Pert. 11	
15-feb-22		Large Scale Structure 2	Advanced GR 10	
16-feb-22	Dark Matter 10		Lin. Cosm. Pert. 12	
17-feb-22			Advanced GR 11	
18-feb-22				
19-feb-22				

20-feb-22			
21-feb-22	Dark Matter 11		Lin. Cosm. Pert. 13
22-feb-22		Large Scale Structure 3	Advanced GR 12
23-feb-22	Dark Matter 12		Lin. Cosm. Pert. 14
24-feb-22			Advanced GR 13
25-feb-22			
26-feb-22			
27-feb-22			
28-feb-22			Structure formation 1
1-mar-22		Intergalactic Medium 1	
2-mar-22		Large Scale Structure 4	
3-mar-22		Intergalactic Medium 2	Advanced GR 14
4-mar-22		Structure formation 2	Advanced GR 15
5-mar-22			
6-mar-22			
7-mar-22			Structure formation 3
8-mar-22		Intergalactic Medium 3	Advanced GR 16
9-mar-22			Structure formation 4
10-mar-22		Intergalactic Medium 4	Advanced GR 17
11-mar-22		Structure formation 5	Advanced GR 18
12-mar-22			
13-mar-22			
14-mar-22			Structure formation 6
15-mar-22		Intergalactic Medium 5	Structure formation 7
16-mar-22			Structure formation 8
17-mar-22		Intergalactic Medium 6	Structure formation 9
18-mar-22			
19-mar-22			
20-mar-22			
21-mar-22			
22-mar-22			
23-mar-22			
24-mar-22			Structure formation 10
25-mar-22			Structure formation 11
26-mar-22			
27-mar-22			
28-mar-22			Structure formation 12
29-mar-22	**APC Admission Exams**		
30-mar-22			
31-mar-22	**END OF II TERM**		
1-apr-22			
2-apr-22			
3-apr-22			
4-apr-22			
5-apr-22			
6-apr-22			
7-apr-22			
8-apr-22			
9-apr-22			
10-apr-22			
11-apr-22		Explosive Nucleosynthesis 1	Data Analysis 1
12-apr-22		Explosive Nucleosynthesis 2	Data Analysis 2
13-apr-22		Explosive Nucleosynthesis 3	
14-apr-22		Explosive Nucleosynthesis 4	
15-apr-22			
16-apr-22			
17-apr-22			
18-apr-22			
19-apr-22	B-modes in CMB polarization 1	Astrobiology 1	GRBs/CRs 1
20-apr-22	B-modes in CMB polarization 2	Astrobiology 2	GRBs/CRs 2
21-apr-22	B-modes in CMB polarization 3	Astrobiology 3	GRBs/CRs 3
22-apr-22	B-modes in CMB polarization 4	Astrobiology 4	GRBs/CRs 4
23-apr-22			
24-apr-22			
25-apr-22			
26-apr-22		Astrobiology 5	GRBs/CRs 5
27-apr-22		Astrobiology 6	GRBs/CRs 6
28-apr-22		Astrobiology 7	GRBs/CRs 7
29-apr-22		Astrobiology 8	GRBs/CRs 8
30-apr-22			
1-mag-22			

2-mag-22		Neural Network 1	Inflation and dark energy 1	
3-mag-22		Neural Network 2	Inflation and dark energy 2	
4-mag-22		Neural Network 3	Inflation and dark energy 3	
5-mag-22		Neural Network 4	Inflation and dark energy 4	
6-mag-22				
7-mag-22				
8-mag-22				
9-mag-22		Binary Stars 1	Inflation and dark energy 5	
10-mag-22		Binary Stars 2	Inflation and dark energy 6	
11-mag-22		Binary Stars 3	Inflation and dark energy 7	
12-mag-22		Binary Stars 4	Inflation and dark energy 8	
13-mag-22				
14-mag-22				
15-mag-22				
16-mag-22	(Sub)mm and Radio Astronomy 1	Binary Stars 5	Inflation and dark energy 9	Compact Objects 1 - h14:30-16
17-mag-22	(Sub)mm and Radio Astronomy 2	Binary Stars 6	Inflation and dark energy 10	Compact Objects 2- h14:30-16
18-mag-22	(Sub)mm and Radio Astronomy 3	Binary Stars 7	Inflation and dark energy 11	Compact Objects 3- h14:30-16
19-mag-22	(Sub)mm and Radio Astronomy 4	Binary Stars 8	Inflation and dark energy 12	Compact Objects 4- h14:30-16
20-mag-22				
21-mag-22				
22-mag-22				
23-mag-22	(Sub)mm and Radio Astronomy 5	Binary Stars 9	Inflation and dark energy 13	Compact Objects 5- h14:30-16
24-mag-22	(Sub)mm and Radio Astronomy 6	Binary Stars 10	Inflation and dark energy 14	Compact Objects 6- h14:30-16
25-mag-22	(Sub)mm and Radio Astronomy 7	Binary Stars 11	Inflation and dark energy 15	Compact Objects 7- h14:30-16
26-mag-22	(Sub)mm and Radio Astronomy 8	Binary Stars 12	Inflation and dark energy 16	Compact Objects 8- h14:30-16
27-mag-22				
28-mag-22				
29-mag-22				
30-mag-22				
31-mag-22				
END OF III TERM				