

**FIRST TRIMESTER (SEPTEMBER 9 TO DECEMBER 5)**

Subjects

**Common obligatory courses:**

32880 - *Gravitation (GRA)*: Coordinators: Tomás Ortín and Rosa Domínguez Tenreiro

**Obligatory courses for the specialty “Elementary Particles and Cosmology”:**

32550 - *Quantum Field Theory (QFT)*: Coordinator: Antonio González-Arroyo

**Optional courses orientated to the specialty of “Elementary Particles and Cosmology”:**

32559 - *Advanced Mathematics (MAV)*: Coordinators: José del Peso and Fernando Marchesano

**Obligatory courses for the specialty “Astrophysics and Physics of the Cosmos”:**

32554 - *Radiative processes in astrophysics (PRA)*: Coordinator: Alexander Knebe

**Optional courses orientated to the specialty of “Astrophysics and Physics of the Cosmos”:**

32565 - *Observational techniques in Astrophysics (TOA)*: Coordinator: Yago Ascasibar

Lectures in the Department of Theoretical Physics (Aula 01.08.SS.300)	M-8-300
Lectures in the Institute of Theoretical Physics (IFT)	Room “GRIS 2”

WEEK-1, SEPTEMBER 9<sup>th</sup> TO 13<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT			PRA
11:00-12:00	QFT	QFT	MAV		PRA
12:00-13:00	GRA	GRA	MAV		TOA*
13:00-14:00	GRA	MAV	GRA		TOA
15:00-16:00					
16:00-17:00					

\*Practical TOA sessions will take place at the UAM Observatory (módulo 15). Some correspond to astronomical observations, and precise dates are subject to meteorological conditions. Additional observations at the Centro Astronómico Hispano-Andaluz in Calar Alto, Almería, will take place in the first trimester of 2020. Evaluation will take place afterwards.

WEEK-2, SEPTEMBER 16<sup>th</sup> TO 20<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT			PRA
11:00-12:00	QFT	QFT	MAV		PRA
12:00-13:00	GRA	GRA	MAV		
13:00-14:00	GRA	MAV	GRA		
15:00-16:00					
16:00-17:00					

WEEK-3, SEPTEMBER 23<sup>rd</sup> TO 27<sup>th</sup>

MASTER IN THEORETICAL PHYSICS

GROUP 280

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT			
11:00-12:00	QFT	QFT	MAV	TOA	TOA
12:00-13:00	GRA	GRA	MAV	TOA	TOA
13:00-14:00	GRA	MAV	GRA		
15:00-16:00		TOA	PRA	PRA	
16:00-17:00		TOA	PRA	PRA	

WEEK-4, SEPTEMBER 30<sup>th</sup> TO OCTOBER 4<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT			
11:00-12:00	Inauguration of Master in Science 11:30 – 13:30	QFT	MAV		
12:00-13:00		GRA	MAV	TOA	TOA
13:00-14:00		MAV	GRA	TOA	TOA
15:00-16:00	GRA		PRA	PRA	
16:00-17:00	GRA		PRA	PRA	

WEEK-5, OCTOBER 7<sup>th</sup> TO 11<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT			
11:00-12:00	QFT	QFT	MAV	TOA	TOA
12:00-13:00	GRA	GRA	MAV	TOA	TOA
13:00-14:00	GRA	MAV	GRA		
15:00-16:00			PRA	PRA	
16:00-17:00			PRA	PRA	

WEEK-6, OCTOBER 14<sup>th</sup> TO 18<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT		PRA	PRA
11:00-12:00	QFT	QFT	MAV	PRA	PRA
12:00-13:00	GRA	GRA	MAV		
13:00-14:00	GRA	MAV	GRA		
15:00-16:00					
16:00-17:00					

WEEK-7, OCTOBER 21<sup>st</sup> TO 25<sup>th</sup>

MASTER IN THEORETICAL PHYSICS

GROUP 280

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT		PRA	PRA
11:00-12:00	QFT	QFT	MAV	PRA	PRA
12:00-13:00	GRA	GRA	MAV	TOA	TOA
13:00-14:00	GRA	MAV	GRA	TOA	TOA
15:00-16:00					
16:00-17:00					

WEEK-8, OCTOBER 28<sup>th</sup> TO NOVEMBER 1<sup>st</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT		PRA	HOLIDAY (TODOS LOS SANTOS)
11:00-12:00	QFT	QFT	MAV	PRA	
12:00-13:00	GRA	GRA	MAV		
13:00-14:00	GRA	MAV	GRA		
15:00-16:00					
16:00-17:00					

WEEK-9, NOVEMBER 4<sup>th</sup> TO 8<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT		PRA	PRA
11:00-12:00	QFT	QFT	MAV	PRA	PRA
12:00-13:00	GRA	GRA	MAV	TOA	TOA
13:00-14:00	GRA	MAV	GRA	TOA	TOA
15:00-16:00					
16:00-17:00					

WEEK-10, NOVEMBER 11<sup>th</sup> TO 15<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT		PRA	HOLIDAY (SAN ALBERTO MAGNO)
11:00-12:00	QFT	QFT	MAV	PRA	
12:00-13:00	GRA	GRA	MAV		
13:00-14:00	GRA	MAV	GRA		
15:00-16:00					
16:00-17:00					

WEEK-11, NOVEMBER 18<sup>th</sup> TO 22<sup>nd</sup>

MASTER IN THEORETICAL PHYSICS

GROUP 280

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	QFT	QFT			
11:00-12:00	QFT	QFT	MAV	TOA	TOA
12:00-13:00	GRA	GRA	MAV	TOA	TOA
13:00-14:00	GRA	MAV	GRA		
15:00-16:00			PRA	PRA	
16:00-17:00			PRA	PRA	

WEEK-12, NOVEMBER 25<sup>th</sup> TO 29<sup>th</sup> - EVALUATION

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
morning		GRA	MAV	PRA	

WEEK-13, DECEMBER 2<sup>nd</sup> TO 6<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
morning	QFT				HOLIDAY

**Deadline for first semester and final marks submission: February 5<sup>th</sup>, 2020**

**SECOND TRIMESTER (DECEMBER 10 TO MARCH 20)**

**Common obligatory courses:**

32549 - *Cosmology (COSMO)*: Coordinators: Alexander Knebe and Savvas Nesseris

**Obligatory courses for the specialty “Elementary Particles and Cosmology”**

32879 - *Standard Model of Particle Physics (SM)*: Coordinators: María José Herrero and Carlos Pena Ruano

SM- Block I: 10 Dec 2019 to 15 Jan 2020 (Maria J. Herrero)

SM-Block II: 21 Jan 2020 to 05 Feb 2020 (Carlos Pena)

SM-Block III: 10 Feb 2020 to 26 Feb 2020 (Maria J. Herrero)

SM-Block IV: 3 Mar 2020 to 4 Mar 2020 (Carlos Pena)

**Optional courses orientated to the specialty of “Elementary Particles and Cosmology”**

32558 - *Advanced Quantum Field Theory (AQFT)*: Coordinator: Margarita García Pérez

32562- *Quantum Entanglement and Information (QEI)*: Coordinator: German Sierra

**Obligatory courses for the specialty “Astrophysics and Physics of the Cosmos”**

32553 - *Interstellar medium (MEIN)*: Coordinator: Eva Villaver

32552 - *Stellar Structure and Evolution (EEE)*: Coordinator: Patricia Sánchez-Blázquez

**Optional courses orientated to the specialty of “Astrophysics and Physics of the Cosmos”:**

32564 - *Stars and Planets Formation (FEP)*: Coordinator: Gwendolyn Meeus

Lectures (Aula 01.08.SS.300)	M-8-300
Lectures in the Institute of Theoretical Physics (IFT)	Room “GRIS 2”
Lectures in the Institute of Theoretical Physics (IFT)	Room “GRIS 1”

WEEK-1, DECEMBER 9<sup>th</sup> TO 13<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
9:00-10:00	HOLIDAY (TRASLADO DE LA INMACULADA)	AQFT	AQFT			
10:00-11:00		AQFT	AQFT		MEIN	
11:00-12:00		SM	SM	FEP	MEIN	
12:00-13:00		COSMO	SM	FEP	FEP	
13:00-14:00		COSMO			FEP	
15:00-16:00			QEI	QEI / FEP *	FEP	
16:00-17:00			QEI	QEI / FEP *	FEP	

\*If there will be students enrolled in both courses, FEP will take place in the morning

WEEK-2, DECEMBER 16<sup>th</sup> TO 20<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00-10:00		AQFT	AQFT		
10:00-11:00		AQFT	AQFT		MEIN
11:00-12:00	SM	SM	SM	FEP	MEIN
12:00-13:00	COSMO	COSMO	SM	FEP	
13:00-14:00	COSMO	COSMO			
15:00-16:00	QEI		QEI	FEP	
16:00-17:00	QEI		QEI	FEP	

WEEK-3, JANUARY 6<sup>th</sup> TO 10<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
9:00-10:00	HOLIDAY	HOLIDAY	AQFT			
10:00-11:00			AQFT		MEIN	
11:00-12:00			SM	FEP	MEIN	
12:00-13:00			SM	FEP	EEE	
13:00-14:00					EEE	
15:00-16:00					QEI / FEP*	MEIN
16:00-17:00					QEI / FEP*	MEIN

\*If there will be students enrolled in both courses, FEP will take place in the morning

WEEK-4, JANUARY 13<sup>th</sup> TO 17<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00-10:00		AQFT	AQFT		
10:00-11:00		AQFT	AQFT		MEIN
11:00-12:00	SM	SM	SM	FEP	MEIN
12:00-13:00	COSMO	COSMO	SM	FEP	EEE
13:00-14:00	COSMO	COSMO			EEE
15:00-16:00	QEI	EEE	QEI / FEP*	MEIN	
16:00-17:00	QEI	EEE	QEI / FEP*	MEIN	

\*If there will be students enrolled in both courses, FEP will take place in the morning

WEEK-5, JANUARY 20<sup>th</sup> TO 24<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00-10:00			AQFT	No lesson	No lesson
10:00-11:00	QEI	AQFT	AQFT		
11:00-12:00	QEI	AQFT	SM		
12:00-13:00	COSMO	COSMO	SM		
13:00-14:00	COSMO	COSMO			
15:00-16:00	EEE	SM	QEI		
16:00-17:00	EEE	SM	QEI		

WEEK-6, JANUARY 27<sup>th</sup> TO 31<sup>st</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
9:00-10:00	HOLIDAY UAM SANTO TOMÁS		AQFT			
10:00-11:00		AQFT	AQFT	FEP	MEIN	
11:00-12:00		AQFT	QEI	FEP	MEIN	
12:00-13:00		COSMO	QEI	MEIN	EEE	
13:00-14:00		COSMO		MEIN	EEE	
15:00-16:00			SM	SM	FEP	
16:00-17:00			SM	SM	FEP	

WEEK-7, FEBRUARY 3<sup>rd</sup> TO 7<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00-10:00			AQFT		
10:00-11:00	QEI	AQFT	AQFT		MEIN
11:00-12:00	QEI	AQFT	SM		MEIN
12:00-13:00	COSMO	COSMO	SM	MEIN	EEE
13:00-14:00	COSMO	COSMO		MEIN	EEE
15:00-16:00	EEE	SM	QEI		
16:00-17:00	EEE	SM	QEI		

WEEK-8, FEBRUARY 10<sup>th</sup> TO 14<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00-10:00		AQFT	AQFT		
10:00-11:00		AQFT	AQFT	FEP	MEIN
11:00-12:00	SM	SM	SM	FEP	MEIN
12:00-13:00	COSMO	COSMO	SM	MEIN	EEE
13:00-14:00	COSMO	COSMO		MEIN	EEE
15:00-16:00	QEI	EEE	QEI	FEP	
16:00-17:00	QEI	EEE	QEI	FEP	

WEEK-9, FEBRUARY 17<sup>th</sup> TO 21<sup>st</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00-10:00		AQFT	AQFT		
10:00-11:00		AQFT	AQFT	FEP	MEIN
11:00-12:00	SM	SM	SM	FEP	MEIN
12:00-13:00	COSMO	COSMO	SM	MEIN	EEE
13:00-14:00	COSMO	COSMO		MEIN	EEE
15:00-16:00	QEI	EEE	QEI	FEP	
16:00-17:00	QEI	EEE	QEI	FEP	

WEEK-10, FEBRUARY 24<sup>th</sup> TO 28<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00-10:00		AQFT	AQFT		
10:00-11:00		AQFT	AQFT	FEP	MEIN
11:00-12:00	SM	SM	SM	FEP	MEIN
12:00-13:00	COSMO	COSMO	SM	MEIN	EEE
13:00-14:00	COSMO	COSMO		MEIN	EEE
15:00-16:00	QEI	EEE	QEI	FEP	
16:00-17:00	QEI	EEE	QEI	FEP	

WEEK-11, MARCH 2<sup>nd</sup> TO 6<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00-10:00			AQFT		
10:00-11:00	QEI	AQFT	AQFT		MEIN
11:00-12:00	QEI	AQFT	SM		MEIN
12:00-13:00	COSMO	COSMO	SM	MEIN	EEE
13:00-14:00	COSMO	COSMO		MEIN	EEE
15:00-16:00	EEE	SM	QEI	EEE	
16:00-17:00	EEE	SM	QEI	EEE	

WEEK-12, MARCH 9<sup>th</sup> TO 13<sup>th</sup> - EVALUATION

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
morning		COSMO	AQFT	MEIN	

WEEK-13, MARCH 16<sup>th</sup> TO 20<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
morning	SM	FEP	QEI	EEE	

**Deadline for second trimester and final marks submission: June 3<sup>rd</sup>, 2020**



**THIRD TRIMESTER (MARCH 22 TO MAY 29)**

**Optional courses for both specialties:**

32555 - *Astroparticle Physics (ASP)*: Coordinators: David G. Cerdeño and Miguel Sanchez-Conde

32556 - *Advanced Cosmology (COAv)*: Coordinator: Gustavo Yepes

**Optional courses orientated to the specialty of "Elementary Particles and Cosmology":**

32560 - *Open Problems in the Standard Model (OPSM)*: Coordinator: Enrique Fernández Martínez

32561 - *Experimental Particle Physics (FISExp)*: Coordinators: Jorge de Troconiz, Claudia Glasman, Juan Terrón

**Optional courses orientated to the specialty of "Astrophysics and Physics of the Cosmos":**

32566 - *Computational Astrophysics (ACO)*: Coordinator: Alexander Knebe

32563 - *Galaxy Formation and Evolution (FEG)*: Coordinator: Rosa Domínguez

Lectures Faculty of Science (Aula 01.08.SS.300) ("FISExp": Aula 01.15.SS.300)	M-8-300 (M-15-300)
Lectures in the Institute of Theoretical Physics (IFT)	Room "GRIS 2"

WEEK-1, MARCH 23<sup>th</sup> TO 27<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	ASP	ASP	CoAV	CoAV	FEG
11:00-12:00	ASP	ASP	CoAV	CoAV	FEG
12:00-13:00	OPSM	OPSM	OPSM	ACO	ACO
13:00-14:00				ACO	ACO
15:00-16:00	FISExp	FISExp	FISExp	FEG	
16:00-17:00	FISExp	FISExp	FISExp	FEG	

WEEK-2 MARCH 30<sup>th</sup> TO APRIL 3<sup>rd</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	ASP	ASP	CoAV	CoAV	FEG
11:00-12:00	ASP	ASP	CoAV	CoAV	FEG
12:00-13:00	OPSM	OPSM	OPSM	ACO	ACO
13:00-14:00				ACO	ACO
15:00-16:00		FISExp	FISExp	FEG	
16:00-17:00		FISExp	FISExp	FEG	

APRIL 6<sup>th</sup> TO 10<sup>th</sup>

HOUR	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	HOLIDAY (SEMANA SANTA)				

WEEK-3, APRIL 13<sup>th</sup> TO 17<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
10:00-11:00	HOLIDAY	ASP	CoAV	CoAV	FEG	
11:00-12:00		ASP	CoAV	CoAV	FEG	
12:00-13:00		OPSM	OPSM	ACO	ACO	
13:00-14:00		OPSM	OPSM	ACO	ACO	
15:00-16:00			FISExp	FISExp	FEG	
16:00-17:00			FISExp	FISExp	FEG	

WEEK-4, APRIL 20<sup>th</sup> TO 24<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	ASP	ASP	CoAV	CoAV	FEG
11:00-12:00	ASP	ASP	CoAV	CoAV	FEG
12:00-13:00	OPSM	OPSM	OPSM	ACO	ACO
13:00-14:00				ACO	ACO
15:00-16:00		FISExp	FISExp	FEG	
16:00-17:00		FISExp	FISExp	FEG	

WEEK-5, APRIL 27<sup>th</sup> TO MAY 1<sup>st</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	ASP	ASP	CoAV	CoAV	HOLIDAY WORKERS DAY
11:00-12:00	ASP	ASP	CoAV	CoAV	
12:00-13:00	OPSM	OPSM	OPSM	ACO	
13:00-14:00				ACO	
15:00-16:00				FEG	
16:00-17:00				FEG	

FISExp: personal work

WEEK-6, MAY 4<sup>th</sup> TO 8<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	ASP	ASP	CoAV	CoAV	FEG
11:00-12:00	ASP	ASP	CoAV	CoAV	FEG
12:00-13:00	OPSM	OPSM	OPSM	ACO	ACO
13:00-14:00				ACO	ACO
15:00-16:00				FEG	
16:00-17:00				FEG	

FISExp: personal work

WEEK-7, MAY 11<sup>th</sup> TO 15<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	ASP	ASP	CoAV	CoAV	HOLIDAY SAN ISIDRO
11:00-12:00	ASP	ASP	CoAV	CoAV	
12:00-13:00	OPSM	OPSM	OPSM	ACO	
13:00-14:00				ACO	
15:00-16:00				FEG	
16:00-17:00				FEG	

FISExp: personal work

WEEK-8, MAY 18<sup>th</sup> TO 22<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00	ASP	ASP	CoAV	CoAV	FEG
11:00-12:00	ASP	ASP	CoAV	CoAV	FEG
12:00-13:00	OPSM	OPSM	OPSM	ACO	ACO
13:00-14:00				ACO	ACO
15:00-16:00				FEG	
16:00-17:00				FEG	

FISExp: personal work

WEEK-9, MAY 25<sup>th</sup> TO 29<sup>th</sup> – EVALUATION

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
morning	OPSM	COAV	ASP	ACO	FEG
afternoon			FISExp		

**Deadline for third trimester and final marks submission: June 3<sup>rd</sup>, 2020**

**MASTER THESIS**

**Ordinary call: (until July 9<sup>th</sup>, 2020)**

**Deadline for final marks submission: (Master Thesis), until July 14<sup>th</sup>, 2020**

**FINAL EVALUATION (SECOND CALL)**

WEEK JUNE 8<sup>th</sup> TO 12<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
MORNING	QFT	GRA	MAV	MEIN	TOA
AFTERNOON					

WEEK 15 TO 19 DE JUNE

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
MORNING	SM	COSMO	AQFT	PRA	EEE
AFTERNOON			FEP		

WEEK JUNE 22<sup>sd</sup> TO 26<sup>th</sup>

TIME TABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
MORNING	ASP	COAv	OPSM	FEG	ACO
AFTERNOON					

WEEK JUNE 29<sup>th</sup> TO JULY 3<sup>rd</sup>

HOUR	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
MORNING	QEI	FISExp	NO LECTIVOS		
AFTERNOON					

**Deadline for final marks submission: July 7<sup>th</sup>, 2020**

**MASTER THESIS**

**Second call: (until September 21<sup>st</sup>, 2020)**

**Deadline for final marks submission (Master Thesis), until September 23<sup>rd</sup>, 2020**