4th International School on Numerical Modelling for Applied Superconductivity (June 17th-21st 2024, Barcelona, Spain)

SCHOOL PROGRAMME

MONDAY 17 JUNE 2024					
	Start	**End**	**Length**	**Title/Description**	**Teacher**
	8:30 am	9:00 am	30	Registration	
	9:00 am	9:15 am	15	Introduction and opening welcome	M. Breschi (Univ. Bologna), A. Portone (F4E)
Session I: Introduction to applications					
	9:15 am	10:30 am	75	Introduction to fusion magnets: present status and design aspects	A. Portone (F4E)
	10:30 am	**10:45 am**	**15**	**Coffee Break**	
	10:45 am	12:00 pm	75	Introduction to electrical machines: present status and design aspects	T. Reis (Oswald Elektromotoren, Germany)
Session II: Introduction to modelling of superconductors					
	12:00 pm	1:00 pm	60	Multi-physics modelling of superconductors	B. Bordini (CERN)
	1:00 pm	**2:00 pm**	**60**	**Lunch**	
	2:00 pm	3:00 pm	60	Applications of multi-physics modelling of superconductors	B. Bordini (CERN)
Session III: Introduction to numerical methods					
	3:00 pm	4:00 pm	60	Basics of numerical methods. Finite element method: theory, weak formulation, meshing, basis functions, implementation.	C. Geuzaine, Université de Liege, Belgium
	4:00 pm	**4:15 pm**	**15**	**Coffee Break**	
	4:15 pm	6:15 pm	120	Numerical modelling of superconductor. Classical & mixed FEM formulation for super-conducting systems. Solution techniques. Numerical examples using Gmsh and GetDP.	C. Geuzaine, Université de Liege, Belgium
TUESDAY 18 JUNE 2024					
Session IV: Electromagnetics (Electrical machines)					
	8:30 am	9:30 am	60	Relevance of benchmarks in numerical models of super-conducting devices. Simplified model of a rotating machine: dynamo with permanent magnets	M. Ainslie (King's College London, UK)
	9:30 am	**9:45 am**	**15**	**Coffee Break**	
Session V: Electromagnetics (Electrical machines) - computer practice					
	9:45 am	11:45 am	120	Dynamo with permanent magnets: a numerical benchmark	M. Ainslie (King's College London, UK)
	11:45 pm	1:15 pm	90	Student Poster session	
	1:15 pm	**2:15 pm**	**60**	**Lunch**	
	Start	**End**	**Length**	**Title/Description**	**Teacher**
Session VI: Electromagnetics (Fusion)					
	2:15 pm	4:15 pm	120	Field computation for fusion magnets.	F. Villone (Universita' Federico II, Naples, Italy)

	Start	End	Length	Title/Description	Teacher
	4:15 am	**4:30 am**	**15**	**Coffee Break**	
Session VII: Electromagnetics (Fusion) - computer practice					
	4:30 pm	6:30 pm	120	Magnetic analysis of tokamak magnets.	P. Testoni (F4E)
WEDNESDAY 19 JUNE 2024					
Session VIII: Design of superconducting electrical machines					
	08:30:00	10:00:00	90	Analytical design of HTS electrical machines	Y. Liu (Harbin Inst. of Technology, China)
	10:00 am	**10:15 am**	**15**	**Coffee Break**	
Session IX: Design of superconducting electrical machines - computer practice					
	10:15 am	12:15 pm	120	Numerical design of a specific machine	Y. Liu (Harbin Inst. of Technology, China)
	12:15 pm	**1:15 pm**	**60**	**Lunch**	
	Social Activity: Downtown Scavenger Hunt				
THURSDAY 20 JUNE 2024					
Session X: Dynamic modelling and AC loss calculation in rotating machines (Electrical machines)					
	8:30 am	10:00 am	90	Calculation of AC losses in windings subjected to a rotating magnetic field	F. Trillaud (UNAM, Mexico)
	10:00 am	**10:15 am**	**15**	**Coffee Break**	
Session XI: AC loss calculation in rotating machines (Electrical machines) - computer practice					
	10:15 am	12:15 pm	120	COMSOL modelling of AC losses in rotating machines	F. Trillaud (UNAM, Mexico)
	12:15 pm	**1:15 pm**	**60**	**Lunch**	
Session XII: Thermo-hydraulics and quench in Cable in Conduit Conductors (Fusion magnets)					
	1:15 pm	3:15 pm	120	Margin, cooling and quench of Cable in Conduit Conductors	L. Bottura (CERN)
	3:15 pm	**3:30 pm**	**15**	**Coffee Break**	
Session XIII: Quench in Cable in Conduit Conductors (Fusion magnets) - computer practice					
	3:30 pm	6:00 pm	150	Quench analysis of tokamak magnets	L. Bottura (CERN)
	8:30 pm			**Social dinner and best poster awards ceremony**	
FRIDAY 21 JUNE 2016					
Session XIV: Mechanics (Fusion)					
	8:30 am	10:30 am	120	Fundamentals of mechanics for superconducting magnets	J. Lorenzo (F4E)
	10:30 am	**10:45 am**	**15**	**Coffee Break**	
Session XV: Fusion magnets mechanics - computer practice					
	10:45 am	12:45 pm	120	Mechanical analysis of tokamak magnets.	L. Reccia (F4E)
	12:45 pm	**1:45 pm**	**60**	**Lunch**	

	Start	End	Length	Title/Description	Teacher
				Wrap-up Session	
	1:45 pm	2:45 pm	60	Final test on school topics for all participants	
	2:45 pm	**3:00 pm**	**15**	**Coffee Break**	
	3:00 pm	3:45 pm	45	Discussion with all participants	
	3:45 pm	4:00 pm	15	School closure	A. Portone (F4E)