The CERN Accelerator School

CAS PROGRAM COMMITTEE

Computing and Modeling for Particle Accelerators

Thursday, 07 December, 2017, 09.00, CERN, B18-3-008

A G E N D A

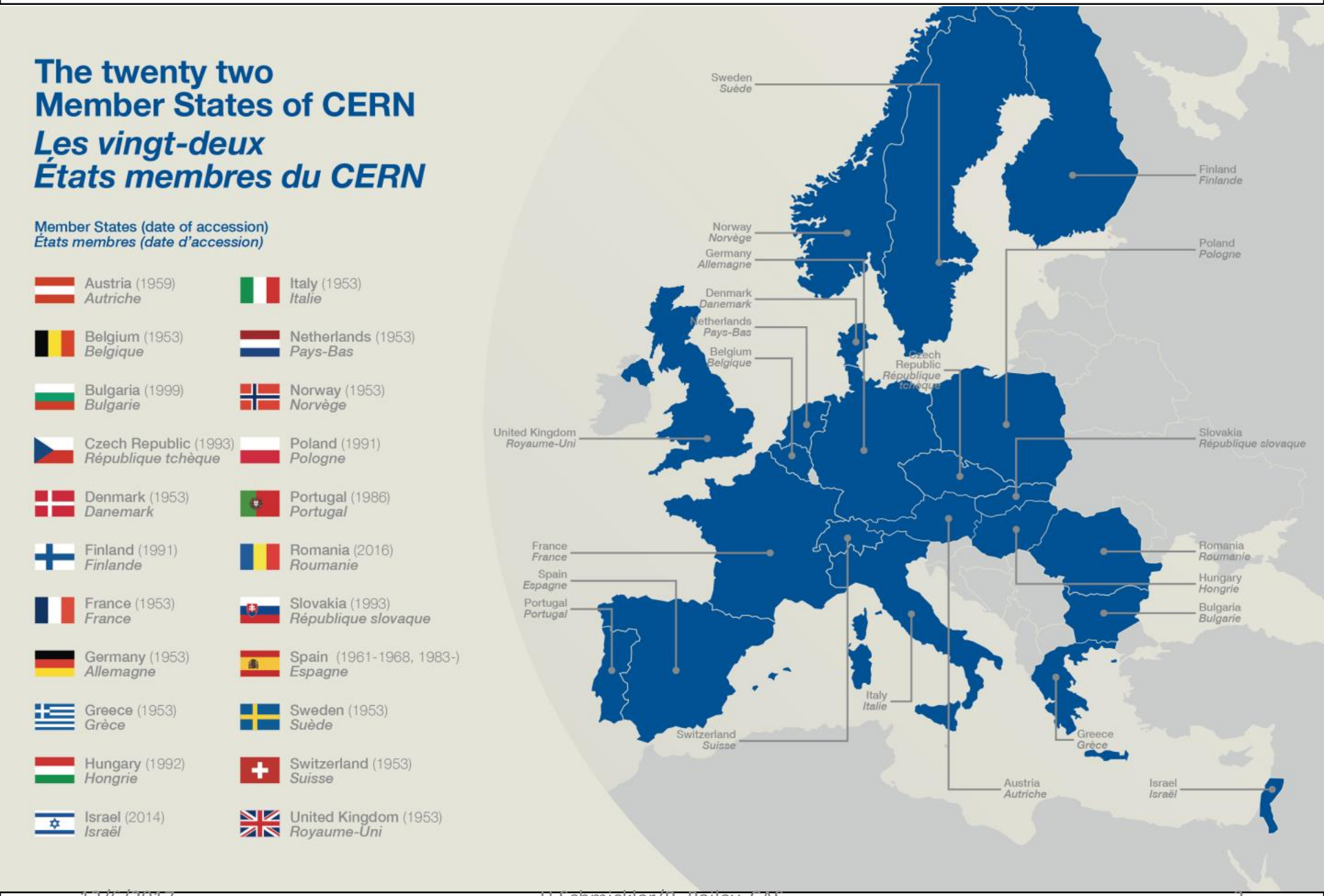
1. Welcome (H.Schmickler)
2. Introduction (H.Schmickler); these slides
3. Local Arrangements (Y.Papaphilippou, S.Tzamaris)
4. Discussion of the program and proposal for lecturers (W.Herr, All)
5. Miscellaneous

Lunch at 12.30

Program committee

RB HS WH BH DR	CAS
Papaphilippou	CERN BE/ABP
Tzamarias	Thessaloniki
Ferrari	CERN EN/STI
Russenschuck	CERN TE/MSC
Wendt	CERN/BI
Wenninger	CERN BE/OP
Adelmann	PSI
Boine-Frankenheim	GSI
Chao	SLAC
Ferrario	INFN
Forrest	KEK
Wanzenberg	DESY
Wolski	Liverpool

The CERN Accelerator School holds courses in all of the Member States of CERN



Have been to all except Israel (joined 2014) and Romania (joined 2016)

The CERN Accelerator School

- Established at the beginning of 1983
  - To preserve and transmit knowledge accumulated, at CERN and elsewhere, on particle accelerators and colliders of all kinds
- This provided a framework for a series of courses
  - General accelerator physics, now yearly, alternating between
    - Introduction to Accelerator Physics
    - Advanced Accelerator Physics
  - Specialized topic in the field, was yearly, now two/three per year
- 68 schools held so far
  - 50 to 60 hours teaching in 1-2 week intensive residential courses
- Occasional courses in the framework of the US-CERN-Japan-Russia Joint Accelerator School (JAS)
  - 14 schools held so far (since 1985)

Scope

Accelerator Physics

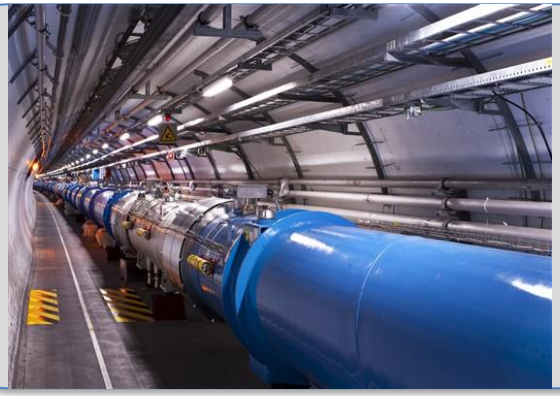
Relativity / Electro-Magnetic Theory / Transverse Beam Dynamics / Longitudinal Beam Dynamics / Linear Imperfections and Resonances / Synchrotron Radiation / Electron Beam Dynamics / Multi-Particle Effects / Non-Linear Dynamics Beam Instabilities / Landau Damping / Beam-Beam Effects

Accelerator Systems

Particle Sources / RFQ / LEBT
RF Systems / Beam Measurement / Feedback Systems / Beam Injection and Extraction / Beam Transfer
Power Convertors / Warm Magnets / Superconducting Magnets / Vacuum Systems
Machine Protection Systems
Computing and Simulation

Accelerators

Linear Accelerators
Synchrotron Light Machines
FELs
FFAGs
Cyclotrons
Synchrotrons
Colliders



Applications

High Energy Physics
Nuclear Physics
Industrial Applications
Medical Applications
Cancer Therapy

Schools 1983-2001

Year	Topic	Town	Country	Proceedings
2001	Particle Accelerators for Medicine and Industry	Pruhonice	Czech Republic	Unpublished
2001	Advanced Accelerator Physics	Seville	Spain	
2000	RF Engineering	Seeheim	Germany	CERN-2005-003
2000	Introduction to Accelerator Physics	Loutraki	Greece	CERN-2005-004
1999	Vacuum Technology	Snekersten	Denmark	CERN-99-05
1999	Advanced Accelerator Physics	Bénodet	France	
1998	Introduction to Accelerator Physics	Oxford	UK	
1997	Measurement and Alignment of Accelerator and Detector Magnets	Anacapri	Italy	CERN-98-05
1997	Advanced Accelerator Physics	Gjøvik	Norway	
1996	Synchrotron Radiation and Free Electron Lasers	Grenoble	France	CERN-98-04
1996	Introduction to Accelerator Physics	Cascais	Portugal	
1995	Superconductivity in Particle Accelerators	Hamburg	Germany	CERN-96-03
1995	Advanced Accelerator Physics	Eger	Hungary	
1994	Cyclotrons, Linacs and Their Applications	La Hulpe	Belgium	CERN 96-02
1994	Introduction to Accelerator Physics	Baden	Austria	
1993	RF Engineering for Particle Accelerators	Anacapri	Italy	
1993	Advanced Accelerator Physics	Rhodes	Greece	CERN 95-06 v1, 95-06 v2
1992	Introduction to Accelerator Physics	Jyvaskyla	Finland	CERN-94-01-V-1, CERN-94-01-V-2
1992	Magnetic Measurement and Alignment	Montreux	Switzerland	CERN-92-05
1991	RF Engineering for Particle Accelerators	Oxford	United Kingdom	CERN-92-03-V-1, CERN-92-03-V-2
1991	Advanced Accelerator Physics	Noordwijkerhout	Netherlands	CERN-92-01
1990	Power Converters for Particle Accelerators	Montreux	Switzerland	CERN-90-07
1990	Introduction to Accelerator Physics	Julich	Germany	CERN-91-04
1989	Synchrotron Radiation and Free Electron Lasers	Chester	United Kingdom	CERN-90-03
1989	Advanced Accelerator Physics	Uppsala	Sweden	CERN-90-04
1988	Superconductivity in Particle Accelerators	Hamburg	Germany	CERN-89-04
1988	Introduction to Accelerator Physics	Salamanca	Spain	CERN-89-05
1987	Advanced Accelerator Physics	Berlin	West Germany	CERN-89-01
1986	Applied Geodesy for Particle Accelerators	Geneva	Switzerland	CERN-87-01
1986	Introduction to Accelerator Physics	Aarhus	Denmark	CERN-87-10
1985	Advanced Accelerator Physics	Oxford	United Kingdom	CERN-87-03-V-1, CERN-87-03-V-2
1984	Introduction to Accelerator Physics	Gif-sur-Yvette	France	CERN-85-19-V-1, CERN-85-19-V-2
1983	Antiprotons for Colliding Beam Facilities	Geneva	Switzerland	CERN-84-15

Schools 2002-2017

Year	Topic	Town	Country	Proceedings
2017	Advanced Accelerator Physics	Egham	UK	
2017	Vacuum for Particle Accelerators	Glumslov	Sweden	
2017	Beam Injection Extraction and Transfer	Erice	Italy	
2016	Introduction to Accelerator Physics	Budapest	Hungary	
2016	FELs and ERLs	Hamburg	Germany	CERN
2015	Intensity Limitations	CERN	Switzerland	CERN-2017-006
2015	Advanced Accelerator Physics	Warsaw	Poland	
2015	Accelerators for Health	Vosendorf	Austria	CERN-2017-004
2014	Plasma Wake Acceleration	CERN	Switzerland	CERN-2016-001
2014	Power Convertors	Baden	Switzerland	CERN-2015-003
2014	Introduction to Accelerator Physics	Prague	Czech Rep	
2013	Superconductivity	Erice	Italy	CERN-2014-005
2013	Advanced Accelerator Physics	Trondheim	Norway	CERN-2014-009
2012	Ion Sources	Senec	Slovakia	CERN-2013-007
2012	Introduction to Accelerator Physics	Granada	Spain	
2011	High Power Machines	Bilbao	Spain	CERN-2013-001
2011	Advanced Accelerator Physics	Chios	Greece	
2010	RF for Accelerators	Ebeltoft	Denmark	CERN-2011-007
2010	Introduction to Accelerator Physics	Varna	Bulgaria	
2009	Magnets	Bruges	Belgium	CERN-2010-004
2009	Advanced Accelerator Physics	Darmstadt	Germany	
2008	Beam Diagnostics	Dourdan	France	CERN-2009-005
2008	Introduction to Accelerator Physics	Frascati	Italy	
2007	Digital Signal Processing	Sigtuna	Sweden	CERN-2008-003
2007	Advanced Accelerator Physics	Daresbury	UK	
2006	Vacuum in Accelerators	Platja d'Aro	Spain	CERN-2007-003
2006	Introduction to Accelerator Physics	Zakopane	Poland	
2005	Small Accelerators	Zeegse	Netherlands	CERN-2006-012
2005	Advanced Accelerator Physics	Trieste	Italy	
2004	Power Converters	Warrington	UK	CERN-2006-010
2004	Introduction to Accelerator Physics	Baden	Austria	
2003	Synchrotron Radiation and Free Electron Lasers	Brunnen	Switzerland	CERN-2005-012
2003	Advanced Accelerator Physics	Zeuthen	Germany	CERN-2006-002
2002	Superconductivity for Accelerators and Detectors	Erice	Italy	CERN-2004-008
2002	Introduction to Accelerator Physics	Sesimbra	Portugal	

J A S

1985	Santa Margherita di Pula, Sardinia, Italy	Nonlinear Dynamics	Lecture Notes in Physics No. 247 Springer-Verlag
1986	South Padre Island, Texas, USA	Frontiers of Particle Beams	Lecture Notes in Physics No. 296 Springer-Verlag
1988	Anacapri, Italy	Frontiers of Particle Beams: Observation, Diagnosis and Correction	Lecture Notes in Physics No. 343 Springer-Verlag
1990	Hilton Head, South Carolina, USA	Frontiers of Particle Beams: Intensity Limitations	Lecture Notes in Physics No. 400 Springer-Verlag
1992	Benalmadena, Spain	Frontiers of Particle Beams: Factories with e+e- Rings	Lecture Notes in Physics No. 425 Springer-Verlag
1994	Maui, Hawaii, USA	Frontiers of Accelerator Technology	World Scientific, 1996 ISBN 981-02-2537-7
1996	Hayama-machi, Japan	Frontiers of Accelerator Technology: RF Engineering for Particle Accelerators	World Scientific, 1999 ISBN 981-0203838-X
1998	Montreux, Switzerland	Beam Measurement	World Scientific, 1999 ISBN 981-02-3881-9
2000	St. Petersburg, Russia	Frontiers of Accelerator Technology: High Quality Beams	AIP, 2001 ISBN 0-7354-0034-2
2002	Long Beach, California, USA	Frontiers of Accelerator Technology in Linacs	World Scientific, 2004
2011	Erice, Italy	Synchrotron Radiation and Free Electron Lasers	No proceedings
2013	Shizuoka, Japan	Introduction to Particle Accelerators (Regional session)	No proceedings
2014	Newport beach, California, USA	Beam Loss and Accelerator Protection	CERN-2016-02
2017	Hayama, Kangawa, Japan	RF Technologies	

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2017

- Beam Injection Extraction & Transfer — Proceedings
  - » Erice, Italy, March
- Vacuum for Accelerators — Proceedings
  - » Max IV, Sweden, June
- Advanced AP
  - » UK, September
- RF technology (JAS)
  - » Japan, October

2018

- Future Colliders — Proceedings
  - » Switzerland, Q1
- Beam Measurement — Proceedings
  - » Finland, Q2
- Introduction to AP
  - » Romania, Q3
- Computing in Accelerators — Proceedings
  - » Greece, Q4

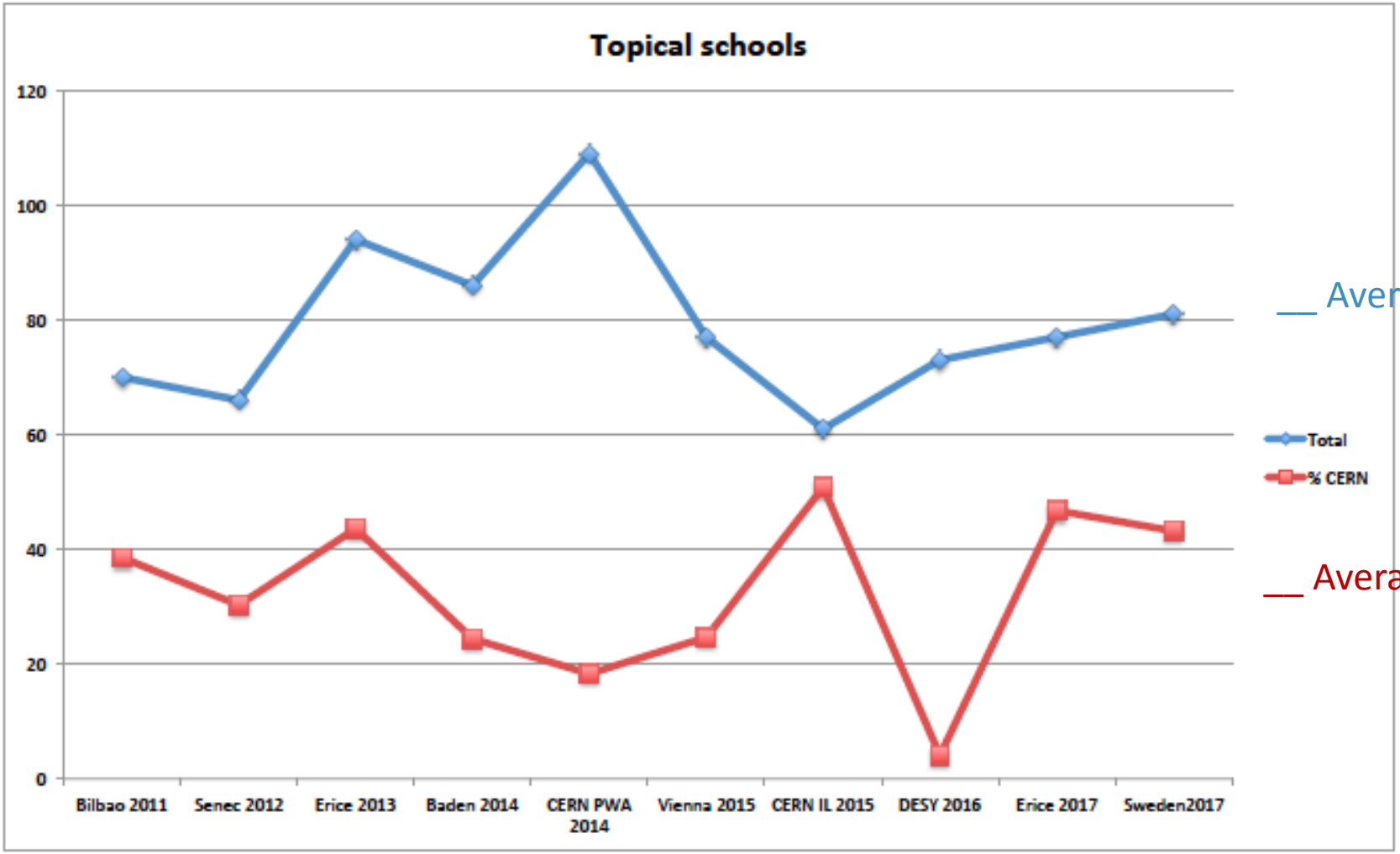
Have been to all except Israel (joined 2014) and Romania (joined 2016)

4 years look-ahead

	Period I Feb-April	Period II May-June	Period IIb End June	Period III Sept-Oct	Period IV Nov-Dec	
2018	**Future Colliders** Switzerland	**Beam Instrumentation** Finland	**Short Introduction** local	**General Introduction** Romenia	**Comp. Methods** Greece	
2019	**Advanced Acc. Concepts** Germany??	**Advanced General** Danmark??	**Short Introduction** local	**General Introduction** Slovakia ??	**RF** Netherlands ??	**JAS: Ion Colliders** Russia
2020	**Warm magnets** Austria??	**Mechanical Engineering**	**Short Introduction** local	**General Introduction**	**Digital Signal Processing**	
2021	**free**	**Advanced General**	**Short Introduction** local	**General Introduction**	**JAS: Very Advanced Beam Dynamics** Americas	

Tasks for the program committee

- Decide on
  - Possible dates for the school
  - Title of the school
  - Estimated/desired number of participants
  - The length and schedule of the school
  - The partition between lectures and practical work (if any)
- Propose
  - Lecture topics
  - Speakers
  - Reserve speakers



__ Average 79

__ Average 32 %

10 nights, 8 working days, 7 hours per day, 56 slot program

Time	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
08:30											
09:30											
09:30											D
10:30	A										E
		COFFEE	COFFEE	COFFEE	COFFEE		COFFEE	COFFEE	COFFEE	COFFEE	P
11:00	R										A
12:00	R I										R
12:00	V										T
13:00	A										U R
	L	LUNCH	LUNCH	LUNCH	LUNCH		LUNCH	LUNCH	LUNCH	LUNCH	
14:30											E
15:30	D										
15:30											D
16:30	A Y										A
		TEA	TEA	TEA	TEA		TEA	TEA	TEA	TEA	
17:00											Y
18:00											
19:00 19:30	Buffet Dinner	Welcome Drink Dinner	Dinner	Dinner	Dinner	Special Dinner	Dinner	Dinner	Dinner	Dinner	

9 nights, 7 working days, 7 hours per day, 49 slot program

Time	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
08:30 09:30										
09:30 10:30	A									D
		COFFEE	COFFEE	COFFEE	COFFEE		COFFEE	COFFEE	COFFEE	E
11:00 12:00	R									P
12:00 13:00	R I V A									A R T U R
	L	LUNCH	LUNCH	LUNCH	LUNCH		LUNCH	LUNCH	LUNCH	
14:30 15:30	D									E
15:30 16:30	A Y									D A
		TEA	TEA	TEA	TEA		TEA	TEA	TEA	
17:00 18:00										Y
19:00 19:30	Buffet Dinner	Welcome Drink Dinner	Dinner	Dinner	Dinner	Special Dinner	Dinner	Dinner	Dinner	

8 nights, 6 working days, 7 hours per day, 42 slot program

Time	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
08:30 09:30									
09:30 10:30	A								D E
		COFFEE	COFFEE	COFFEE		COFFEE	COFFEE	COFFEE	P
11:00 12:00	R R I								A R
12:00 13:00	V A								T U R
	L	LUNCH	LUNCH	LUNCH		LUNCH	LUNCH	LUNCH	
14:30 15:30	D								E
15:30 16:30	A Y								D A
		TEA	TEA	TEA		TEA	TEA	TEA	
17:00 18:00									Y
19:00 19:30	Buffet Dinner	Dinner	Dinner	Dinner	Special Dinner	Dinner	Dinner	Dinner	

Case Studies at recent topical schools

- Introduced for High Power Hadron Machines (Bilbao 2011)
  - Qualified success, even with no time allocated for work
  - Students were divided into small groups and given ONE TASK to pursue

- Repeated for

– Ion Sources (Senec 2012)	Success (built into program)
– Superconductivity (Erice 2013)	Success (built into program)
– JAS on Machine Protection (California 2014)	Success (built into program)
– Medical Applications (Vosendorf 2015)	Success (built into program)
• Same task for all	
– PWA (CERN 2014)	Limited Success
• Not enough time allocated in (short) program	
– FELs and ERLs (Hamburg 2016)	Qualified success (built into program)
• Shortage of experts	
– Injection and Extraction (Erice 2017)	Success (built into program)
– Vacuum (Glumslov 2017)	Big Success (built into program)
• ALL STUDENTS FOLLOWED ALL TASKS	
• Rather heavy on manpower	

- Considered not appropriate for
  - Power Converters (Baden 2014)
  - Intensity Limitations (CERN 2015)

Case Studies / Hands-ON Courses at upcoming topical schools

- Will be done for
  - Future Colliders (Zurich 2018)
    - 3 tasks envisaged
    - Students will be divided into small groups and pursue ONE TASK
  - Beam Instrumentation (Helsinki 2018)
    - 4 hands-on courses envisaged
    - ALL STUDENTS WILL FOLLOW ALL TASKS
    - Note length of school (see later)
- Is it appropriate for this school ?
  - If Yes
    - What format should it take ?
    - Need to build fully into the program
    - Need space and facilities
    - Need Case Study coordinator(s)
    - Need experts in the field to act as tutors throughout the school

Draft Program for the 2017 CAS - Vacuum for Particle Accelerators, June 6 to 16

	Tue 6	Wed 7	Thu 8	Fri 9	Sat 10	Sun 11	Mon 12	Tue 13	Wed 14	Thu 15	Fri 16
08:30	Arrival day and registration	Opening	Materials & properties IV: Outgassing Chiggiato (CERN)	Getter pumps Maccallini (SAES)	Industrial Vacuum Applications Chew (Edwards)	Excursion	Surface Characterisation Valizadeh (Darsbury)	Transport to MaxIV	Controlling Particles/Dust in Vacuum Systems Lilje (DESY)	Vacuum Design Aspects Reich Sprenger (GSI)	Departure day
09:30		Introduction to machine parameters Tavares (MaxIV)	Vacuum Gauges I Jousten (PTB, D)	Ion pumps Audi (Agilent)	Vacuum Gauges II Jousten (PTB, D)		Interactions between Beams and Vacuum System Walls Cimino (INFN)	Seminar on MaxIV Grabski	Beam Induced Radioactivity and Radiation Hardness Cerutti (CERN)	Manufacturing and Assembly for Vacuum Technology Mathot (CERN)	
10:30		Coffee					Coffee		Coffee		
11:00		Fundamentals of Vacuum Technology Al Dmour (MaxIV)	Mechanical Vacuum Pumps Barfuss (Pfeiffer)	Introduction to Cryogenics Claudet (CERN)	Beam Induced Desorption Malyshev (STFC, UK)		Surface Cleaning and Finishing Taborelli (CERN)	Seminar on ESS Juni Ferreira	Radiation Damage and its Consequence Brugger (CERN)	The Real Life of Ooperation Baglin (CERN)	
12:00		Impedance & instabilities Wanzenberg (DESY)	Computation for Vacuum System of Accelerators Kersevan (CERN)	Cryopumping Baglin (CERN)	Beam-Gas Interaction Ferro Luzzi (CERN)		Thin-Film Coating Costa Pinto (CERN)		Control & Diagnostic Gomes (CERN)	Challenges for Vacuum Technology of Future Accelerators Jimenez (CERN)	
13:00		Lunch					Lunch				
14:30		Materials & properties I: introduction Sgobba (CERN)	Tutorials in 5 groups See below	Tutorials in 5 groups See below	Tutorials in 5 groups See below		Tutorials in 5 groups See below	Visit to Max IV	Tutorials in 5 groups See below	Tutorial work closeout	
15:30		Materials & properties II: Thermal and Electrical Calatroni (CERN)						Visit to ESS			
16:30		Coffee					Coffee		Coffee		
17:00		Materials & properties III: Mechanical Behaviour Garion (CERN)	Tutorial work	Tutorial work	Tutorial work		Tutorial work	Transport to Hotel	Tutorial work	Closing	
18:00		**30h lectures, 17h tutorials, Opening/Closing (49h) + full 7h day at lab**									
19:30		Dinner									

Tutorial 1 : MOLFLOW+ Monte-Carlo	Group 1	Group 5	Group 4		Group 3		Group 2	
Tutorial 2 : Impedance calculations	Group 2	Group 1	Group 5		Group 4		Group 3	
Tutorial 3 : Mechanical & Material Aspec	Group 3	Group 2	Group 1		Group 5		Group 4	
Tutorial 4 : Residual Gas Analysis	Group 4	Group 3	Group 2		Group 1		Group 5	
Tutorial 5 : Leak Detection and Pumping	Group 5	Group 4	Group 3		Group 2		Group 1	

Provisional program for FC school, Q1 2018

	Wed, 21.2.2018	Thu, 22.2.2018	Fri 23.2.2018	Sat, 24.2.2018	Sun, 25.2.2018	Mon, 26.2.2018	Tue, 27.2.2018	Wed, 28.2.2018	Thu, 1.3.2018	Fri,2.3.2018	Sat, 3.3.2018	Sun, 4.3.2018	Mon, 5.3.2018	Tue,6.3.2018
08:30	Arrival day and registration	Opening Seminar L.Linssen	Detectors for high energy colliders/Machine detector interface I F.Tecker	Recap of long. BD I J.Wenninger	Collider Diagnostics / Measurement of critical beam parameters I W.Herr	Beam-Beam Effects/Beamstrahlung I O.Bolne-Fr...	Instabilities in high energy colliders and their mitigation I D.Schulte	Excursion	Linear Collider Beam dynamics I T. Zickler	Normalconducting & permanent magnets W.Wuensch	Normal conducting high gradient Rf systems I N. Mokhov	Interaction of particles with matter T.Schlicher	Low Level RF challenges/timing systems M.Paralliev	Departure day
09:20		Discussion								Discussion				
09:30		High energy physics at colliders M. Mangano	Recap of transverse BD I H.Schmickler	Large colliders critical technologies M.Jimenez	Circular Hadron Collider beam dynamics I M.Syphers	Circular Lepton Collider beam dynamics/damping rings I K. Olde	Injection and extraction M.Alba		Superconducting RF systems I E.Jensen	Superconducting RF systems II E.Jensen	Normal conducting high gradient Rf systems II W.Wuensch	magnet vibration and feedbacks A.Seryi	Kickers & Septa M.Paralliev	
10:30		Coffee									Coffee			
11:00		Luminosity goals, critical parameters B. Muratori	Detectors for high energy colliders/Machine detector interface II L.Linssen	Recap of long. BD II F.Tecker	Collider Diagnostics / Measurement of critical beam parameters II J.Wenninger	Beam-Beam Effects/Beamstrahlung II W.Herr	Instabilities in high energy colliders and their mitigation II O.Bolne-Fr...		Linear Collider Beam dynamics II D.Schulte	Single Shot high brillance beam transport V. Kain	RF power systems, CLIC drive beam S. Doebert	machine protection concepts N. Mokhov	alignment&metrology/ requirements and realization D. Missiaen	
11:50		Discussion									Discussion			
12:00		Linear Collider studies overview S.Stapnes	Recap of transverse BD II H.Schmickler	Discussion Session I H.Schmickler	Circular Hadron Collider beam dynamics II M.Syphers	Circular Lepton Collider beam dynamics/damping rings II K. Olde	Discussion Session II H.Schmickler		Superconducting RF systems II E.Jensen	High brightness beam transport V.Kain	Discussion III H.Schmickler	Final Focus layouts and stability considerations A. Seryi	positron production M. Kuriki	
13:00		Lunch								Lunch				
14:30		Large circular colliders overview(including h-e option) M.Benedikt	Lessons learnt from LEP/LHC M.Lamont	Case Studies Introduction WH/BH/DS	Free	Case Studies II WH/BH/DS	Case Studies IV WH/BH/DS		Superconducting material/cables C. Senatore	Case Studies VI WH/BH/DS	Free	Case Studies VIII WH/BH/DS	Reliability Engineering/Availibity of a large collider complex A.Lundecke	
15:30		Introduction to a Muon Collider and Gamma Collider W.Chou	Lessons learnt from SLC NN	Case Studies I WH/BH/DS		Case Studies III WH/BH/DS	Case Studies V WH/BH/DS		Superconducting magnets /Low temeprature Superconductors L. Bottura	Case Studies VII WH/BH/DS		Case Studies IX WH/BH/DS	Case Studies Presentations I WH/BH/DS	
16:30		Coffee				Coffee				Coffee			Coffee	
17:00		The big picture of high energy physics R.Heuer	Large colliders civil engineering and siting J.Osborne	polarized electron beams/energy calibration J.Wenninger		Seminar I local	Vacuum Challenges R.Kersevan		Superconducting magnets /High temperature Superconductors L. Bottura	Advanced future Collider Concepts P. Muggli		collimators & Dumps & Masks M.Seidel	Case Studies Presentations II WH/BH/DS	
18:00		Discussion											Closing	
19:30		Dinner							Dinner			Gala Dinner	Dinner	

Provisional program for BI school, Q2 2018

08:30	Arrival day and registration	Opening	BD Requirements Overview/Measurement Principles III	Digital Signal processing I	Digital Signal processing II	Digital Signal processing III	BPM systems II	Excursion	RF measurement techniques	Lasers (technologies, setups)	Time-and Frequency Domain	Collective Effects	Timing and Synchronization II	Departure day
		local speaker/ H.Schmickler	G. Kube	T. Schilcher	T. Schilcher	T. Schilcher	M.Wendt		M. Wendt	L. Corner	H. Schmickler	J. Fox	A. Gallo	
09:30		BD Requirements Overview/Measurement Principles I	Analog Electronics I	Numerical methods, mathematical background I	Numerical methods, mathematical background II	Bunch Length Diagnostics I	Bunch Length Diagnostics II		Introduction to Optics (basics, components, diffraction)	Medical Applications Instrumentation & Diagnostics	Beam Loss Monitors	Timing and Synchronization I	Transverse Feedbacks II	
		G. Kube	J. Bellemans	L. Nadolski	L. Nadolski	A. Gillespie	A. Gillespie		L. Corner	A. Peters	K. Wittenburg	A. Gallo	J. Fox	
10:30		Coffee							Coffee					
11:00		Transverse beam dynamics recap I	Video Cameras (signal generation and transmission)	Analog Electronics II	Analog Digital Conversion	BPM systems I	Transverse Profile Measurements I		Transverse Profile Measurements II	Diagnostics Examples from high energy-colliders	Schottky Diagnostics	Photon Beam Lines diagnostics	Diagnostic Needs for Wakefield Accelerator Experiments	
		H.Schmickler	G. Kube	J. Bellemann	M. Gasior	M. Wendt	E. Bravin		E. Bravin	R.Jones	P. Kowina	K. Wittenburg	A. Cianchi	
12:00		BD Requirements Overview/Measurement Principles II	Introduction to practical courses	Diagnostics Examples from light sources	Diagnostics Examples from CTF3	Tune/Chromaticty/Coupling Measurements	Discussion I		Intensity Measurements	Emittance Measurements	Diagnostics Examples from lepton-linacs and FELs	Transverse Feedbacks I	Discussion II	
		G. Kube	R. Jones	K. Wittenburg	F.Tecker	R.Jones	H.Schmickler		A. Peters	E. Bravin	A. Cianchi	J. Fox	H.Schmickler	
13:00		Lunch								Lunch				
14:30		Transverse beam dynamics recap II	Block A -1	Block A- 4	Free	Block B -1	Block B- 4		Block C -1	Block C- 4	Free	Block D -1	Block D- 4	
		H.Schmickler	Course Team	Course Team		Course Team	Course Team		Course Team	Course Team		Course Team	Course Team	
15:30		Longitudinal beam dynamics recap	Block A- 2	Block A -5		Block B- 2	Block B -5		Block C- 2	Block C -5		Block D- 2	Block D -5	
		F. Tecker	Course Team	Course Team		Course Team	Course Team		Course Team	Course Team		Course Team	Course Team	
16:30		Coffee	Coffee			Coffee			Coffee			Coffee		
17:00		OneS-OneM	Block A -3	Block A- 6		Block B -3	Block B- 6		Block C -3	Block C- 6		Block D -3	Block D- 6	
		All	Course Team	Course Team		Course Team	Course Team		Course Team	Course Team		Course Team	Course Team	
18:00				Seminar I		Poster session				Seminar II			Closing	
				local speaker		Organizer				local speaker				
19:30	Dinner													

Topics (for illustration – needs developing)

Topic and Speakers for CAS on Computing Techniques, Greece, Q4 2018			
Topic	**Hrs**	**Speaker**	**Reserve**
Opening	1	Schmickler plus local	
Closing	1	Gianotti?	
Seminar 1	1	local	
Seminar 2	1	local	
Overview and particular aspects	4		
Mathematical background	4		
Single particle dynamics	6		
Monte Carlo techniques	5		
Computing techniques	4		
Field solvers	4		
Multi particle dynamics	2		
Numericla techniques	3		
Operation and control	5		
9	37		