



The CERN Accelerator School and
Max IV Laboratory are organizing a course on

Vacuum for Particle Accelerators

6 to 16 June, 2017

Hotel Örenäs Slott, Glumslöv, Sweden

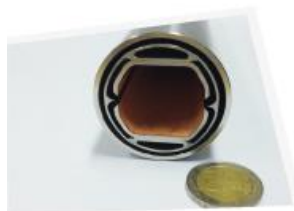
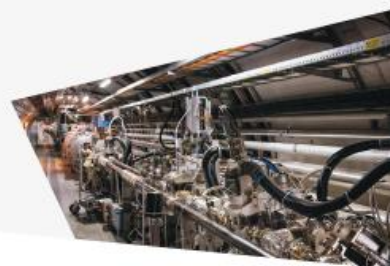
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vacuum system will then be treated in some detail, as will beam-vacuum phenomena.

Most afternoons will be devoted to a series of tutorials, where the participants will have the opportunity to work in small groups on a variety of practical techniques.

A full day visit incorporating both Max IV and ESS, both in Lund, will provide a current insight into the field.



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

The twenty two Member States of CERN *Les vingt-deux États membres du CERN*

Member States (date of accession)
États membres (date d'accession)

 Austria (1959) <i>Autriche</i>	 Italy (1953) <i>Italie</i>
 Belgium (1953) <i>Belgique</i>	 Netherlands (1953) <i>Pays-Bas</i>
 Bulgaria (1999) <i>Bulgarie</i>	 Norway (1953) <i>Norvège</i>
 Czech Republic (1993) <i>République tchèque</i>	 Poland (1991) <i>Pologne</i>
 Denmark (1953) <i>Danemark</i>	 Portugal (1986) <i>Portugal</i>
 Finland (1991) <i>Finlande</i>	 Romania (2016) <i>Roumanie</i>
 France (1953) <i>France</i>	 Slovakia (1993) <i>République slovaque</i>
 Germany (1953) <i>Allemagne</i>	 Spain (1961-1968, 1983-) <i>Espagne</i>
 Greece (1953) <i>Grèce</i>	 Sweden (1953) <i>Suède</i>
 Hungary (1992) <i>Hongrie</i>	 Switzerland (1953) <i>Suisse</i>
 Israel (2014) <i>Israël</i>	 United Kingdom (1953) <i>Royaume-Uni</i>



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**
- 66 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)
 - 13 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

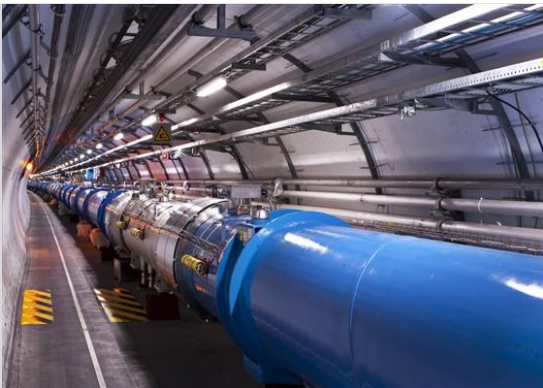
Particle Sources / RFQ / LEBT
RF Systems / Beam
Measurement / Feedback
Systems / Beam Injection and
Extraction / Beam Transfer
Power Convertors / Warm
Magnets / Superconducting
Magnets / **Vacuum Systems**
Machine Protection Systems
Radiation and Radioprotection

Accelerators

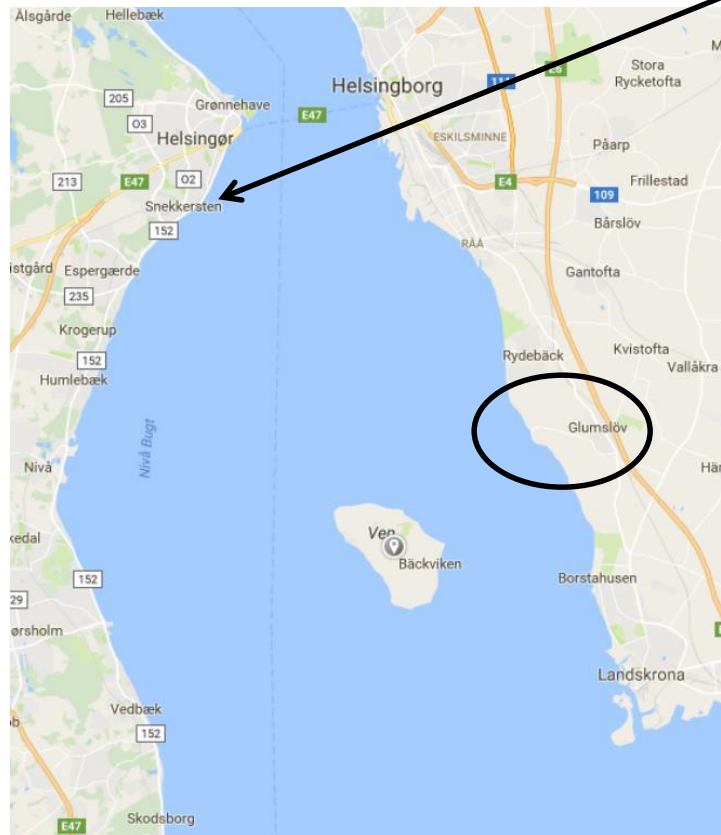
Linear Accelerators
Synchrotron Light Machines
FELs
FFAGs
Cyclotrons
Synchrotrons
Colliders

Applications

High Energy Physics
Nuclear Physics
Industrial Applications
Medical Applications
Cancer Therapy



Schools 1983-1999



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

Schools 2000-2016

Year	Topic	Town	Country	Level	Proceedings
2016	General Accelerator Physics	Budapest	Hungary	Introduction	
2016	FELs and ERLs	Hamburg	Germany	Specialised	
2015	Intensity Limitations	CERN	Switzerland	Specialised	CERN-2016-002
2015	General Accelerator Physics	Warsaw	Poland	Advanced	
2015	Accelerators for Health	Vosendorf	Austria	Specialised	CERN-2016-
2014	Plasma Wake Acceleration	CERN	Switzerland	Specialised	CERN-2016-001
2014	Power Convertors	Baden	Switzerland	Specialised	CERN-2015-003
2014	General Accelerator Physics	Prague	Czech Rep	Introduction	
2013	Superconductivity	Erice	Italy	Specialised	CERN-2014-005
2013	General Accelerator Physics	Trondheim	Norway	Advanced	CERN-
2012	Ion Sources	Senec	Slovakia	Specialised	CERN-2013-007
2012	General Accelerator Physics	Granada	Spain	Introduction	
2011	High Power Machines	Bilbao	Spain	Specialised	CERN-2013-001
2011	General Accelerator Physics	Chios	Greece	Intermediate	
2010	RF for Accelerators	Ebeltoft	Denmark	Specialised	CERN-2011-007
2010	General Accelerator Physics	Varna	Bulgaria	Introduction	
2009	Magnets	Bruges	Belgium	Specialised	CERN-2010-004
2009	General Accelerator Physics	Darmstadt	Germany	Intermediate	
2008	Beam Diagnostics	Dourdan	France	Specialised	CERN-2009-005
2008	General Accelerator Physics	Frascati	Italy	Introduction	
2007	Digital Signal Processing	Sigtuna	Sweden	Specialised	CERN-2008-003
2007	General Accelerator Physics	Daresbury	UK	Intermediate	
2006	Vacuum in Accelerators	Platja d'Aro	Spain	Specialised	CERN-2007-003
2006	General Accelerator Physics	Zakopane	Poland	Introduction	
2005	Small Accelerators	Zeegse	Netherlands	Specialised	CERN-2006-012
2005	General Accelerator Physics	Trieste	Italy	Intermediate	
2004	Power Converters	Warrington	UK	Specialised	CERN-2006-010
2004	General Accelerator Physics	Baden	Austria	Introduction	
2003	Synchrotron Radiation and Free Electron Lasers	Brunnen	Switzerland	Specialised	CERN-2005-012
2003	General Accelerator Physics	Zeuthen	Germany	Intermediate	
2002	Superconductivity for Accelerators and Detectors	Erice	Italy	Specialised	CERN-2004-008
2002	General Accelerator Physics	Sesimbra	Portugal	Introduction	
2001	Particle Accelerators for Medicine and Industry	Pruhonice	Czech Republic	Specialised	Unpublished
2001	General Accelerator Physics	Seville	Spain	Intermediate	
2000	RF Engineering	Seeheim	Germany	Specialised	CERN-2005-003
2000	General Accelerator Physics	Loutraki	Greece	Introduction	

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2017

- Injection & Extraction
 - » Erice, Italy, March
- Vacuum for Accelerators
 - » MaxIV, Sweden, June
- Advanced AP
 - » RHUL, UK, September
- RF technologies (JAS)
 - » Japan, October

2018

- Future Colliders for HEP
 - » Switzerland
- Beam Instrumentation
 - » Helsinki, Finland
- Introduction to AP
 - » Romania
- Computing and Simulation
 - » Netherlands



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

Vacuum, Glumslöv, Sweden

- In collaboration with Max IV
 - Eshraq Al Dmour
 - Marek Grabski
 - Carolina Ingvander
 - Karolin Lundberg
 - Pedro Fernandes Tavares
 - (Machine Director)
- In Hotel Örenäs Slott
 - Mikael Petersson
 - Caroline Lindholm
- This is the third time that the CAS has been held in Sweden and the first time in the south



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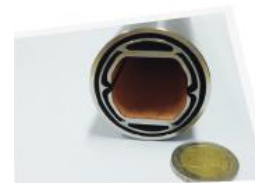
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Most afternoons will be devoted to a series of tutorials, where the participants will have the opportunity to work in small groups on a variety of practical techniques.

A full day visit incorporating both Max IV and ESS, both in Lund, will provide a current insight into the field.



 Agilent Technologies

 HIDEN ANALYTICAL

 saes group

 PFEIFFER VACUUM

 VAT

 Leybold

Life in Hotel Örenäs Slott

- Breakfast, lunch and dinner in the castle on 1st floor
 - Breakfast and lunch buffet
 - Dinner served 2 course meal, **no beer or wine included**
 - **There is a bar next to the dining room**
- Banquet on Thursday 15th in the castle on 2nd floor
- WiFi
 - In conference rooms Public2 Orenas2016!
 - Elsewhere homerun every 24h
- Gyms, pool, deck with hot tubs and saunas
- Running or walking trails
- Checkout at 12.00 Friday 16th (may be negotiable)

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 Manini (SAES)	Industrial Vacuum Applications Chew (Edwards)	Excursion	Surface Characterisation Valizadeh (Darsbury)	Transport to MaxIV	Controlling Partides/Dust in Vacuum Systems Lilje (DESY)	Vacuum Acceptance Tests Bregliozzi (CERN)	Departure day		
09:30		Introduction to machine parameters Tavares (MaxIV)	Vacuum Gauges I Jousten (PTB)	Ion pumps Maccarrone (Agilent)	Vacuum Gauges II Jousten (PTB)		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)			
10:30-11:00		Coffee					Coffee		Coffee				
		Fundamentals of Vacuum Technology Al Dmour (MaxIV)	Mechanical Vacuum Pumps Barfuss (Pfeiffer)	Introduction to Cryogenics Claudet (CERN)	Beam Induced Desorption Malyshev (STFC)		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)	Crypumping Baglin (CERN)	Beam-Gas Interaction Ferro Luzzi (CERN)		Thin-Film Coating Costa Pinto (CERN)		Control & Diagnostic Pigny, Rocha (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					
16:30-17:00		Coffee					Coffee		Coffee				
		Materials & properties III: Mechanical Behaviour Garion (CERN)	Tutorial work	Tutorial work	Tutorial work		Tutorial work	Transport to Hotel	Tutorial work	Closing			
18:00													
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 Aspects	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

Teaching

- All lectures in Foren auditorium
- Tutorials (= practical work)
 - 5 groups of 16 rotate through the 5 tutorials
 - As well as practical work each group will be given a task
 - Results to be presented on Thursday 15
 - Group 1 does presentation on tutorial 1
 - Group 2 does presentation on tutorial 2
 - Group 3 does presentation on tutorial 3
 - Group 4 does presentation on tutorial 3
 - Group 5 does presentation on tutorial 5

Tutorials

	coordinator	tutor	needed	provider	room
Tutorial 1 : MOLFLOW+ Monte-Carlo	Kersevan	Ady	Computers	CERN	Knopen + Palsteken
Tutorial 2 : Impedance calculations	Calatroni	Salvant	Computers	CERN	Kolen + Durken
Tutorial 3 : Mechanical & Material Aspects	Garion	Sitko	Valves	VAT	Foren
Tutorial 4 : Residual Gas Analysis	Chiggiato	Jenninger	RGA	Hiden	EESTI (in the castle)
Tutorial 5 : Leak Detection and Pumping	Cruikshank	Bregliozzi	Leak detect	Leybold	Skrovet

Tutorial	Coord	Thu	Fri	Sat	Mon	Wed
T 1 : MOLFLOW+ Monte-Carlo	RK	G 1	G 5	G 4	G 3	G 2
T 2 : Impedance calculations	SC	G 2	G 1	G 5	G 4	G 3
T 3 : Mechanical & Material Aspects	CG	G 3	G 2	G 1	G 5	G 4
T 4 : Residual Gas Analysis	PCh	G 4	G 3	G 2	G 1	G 5
T 5 : Leak Detection and Pumping	PCr	G 5	G 4	G 3	G 2	G 1

Tutorial groups by last name

GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5
Béchu	Buonocore	Azpeitia	Andujar	Dassa
Buratin	Carriere	Chirpaz-Cerbat	AL-Najdawi	Galimov
Gil Costa	Cattenoz	Dolezal	Callegari	Grec
Krzempek	Di Paolo	Gevorgyan	Chatzigeorgiou	Lain Amador
Leclercq	Duignan	Harrison	Chevallay	Lundmark
Monge Garcia	Garcia-Tabares	Hauer	Deliege	Perez Espinos
Nelen	Grob	Knebel	Eggert	Pirani
Novinec	Jin	La Francesca	Gilg	Plambeck
Pasquino	Lamure	Morrone	Hauser	Roslund
Salemme	Lee	Narduzzi	Luethi	Sapountzis
Salveter	Li	Paju	Michet	Sublet
Scolari	Reinhed	Petit	Oliver	Tang
Svidetelev	Rumiz	Popp	Pigny	Vardanyan
Villanueva Guerrero	Salahshoor	Richard	Rosenberg	Vorobyev
Wallner	Sinkovits	Rocha	Santos Diaz	Warner
Zandonella	Sirvinskaite	Spoelstra	Wen	Zhang

Group 1

First Name	Last Name	Institute
Nicolas	Béchu	Synchrotron SOLEIL
Elena	Buratin	CERN
Miguel	Gil Costa	CERN
Lukasz	Krzempek	CERN
Yann	Leclercq	CERN
Raquel	Monge Garcia	ALBA - CELLS
Robin	Nelen	CERN
Luka	Novinec	Elettra - Sincrotrone Trieste
Chiara	Pasquino	CERN
Roberto	Salemme	CERN
Friederike	Salveter	ADAM SA
Simone Maria	Scolari	European Spallation Source ERIC
Alexey	Svidetelev	JINR
Raúl	Villanueva Guerrero	European XFEL GmbH
Joachim	Wallner	EBG MedAustron GmbH
Adriano	Zandonella	PSI

Group 2

First Name	Last Name	Institute
Luca Rosario	Buonocore	CERN
Shawn	Carriere	Canadian Light Source
Gregory	Cattenoz	CERN
Chiara	Di Paolo	CERN
Martin	Duignan	Diamond light source
elisa	garcia-tabares	CERN
Laura	Grob	CERN
Xiuguang	Jin	High Energy Accelerator Research Organization
Anne-Laure	Lamure	CERN
Yong Joong	Lee	European Spallation Source ERIC
Peng	Li	IMP, Chinese Academy of Sciences
Peter	Reinhed	Stockholm University
Luca	Rumiz	ELETTRA Sincrotrone Trieste S.C.p.A.
Mostafa	Salahshoor	IPM
Theo	Sinkovits	CERN
Ruta	Sirvinskaite	STFC

Group 3

First Name	Last Name	Institute
Jon	Azpeitia	ESS Bilbao
Didier	Chirpaz-Cerbat	CEA/DRF/Irfu/SACM/LEDA
Vojtech	Dolezal	Thermo Fisher Scientific
Artur	Gevorgyan	CELLS-ALBA
Anthony	Harrison	CERN
Volker	Hauer	Karlsruhe Institute of Technology
Lennart	Knebel	DESY
Eliana	La Francesca	INFN-LNF
Marco	Morrone	CERN
Manuele	Narduzzi	CERN
Esa	Paju	Lund University / Max IV
Valentine	Petit	CERN
Ulrich	Popp	ESR
Thibaut	Richard	CERN
Andre	Rocha	CERN
Hilko	Spoelstra	European Spallation Source ERIC

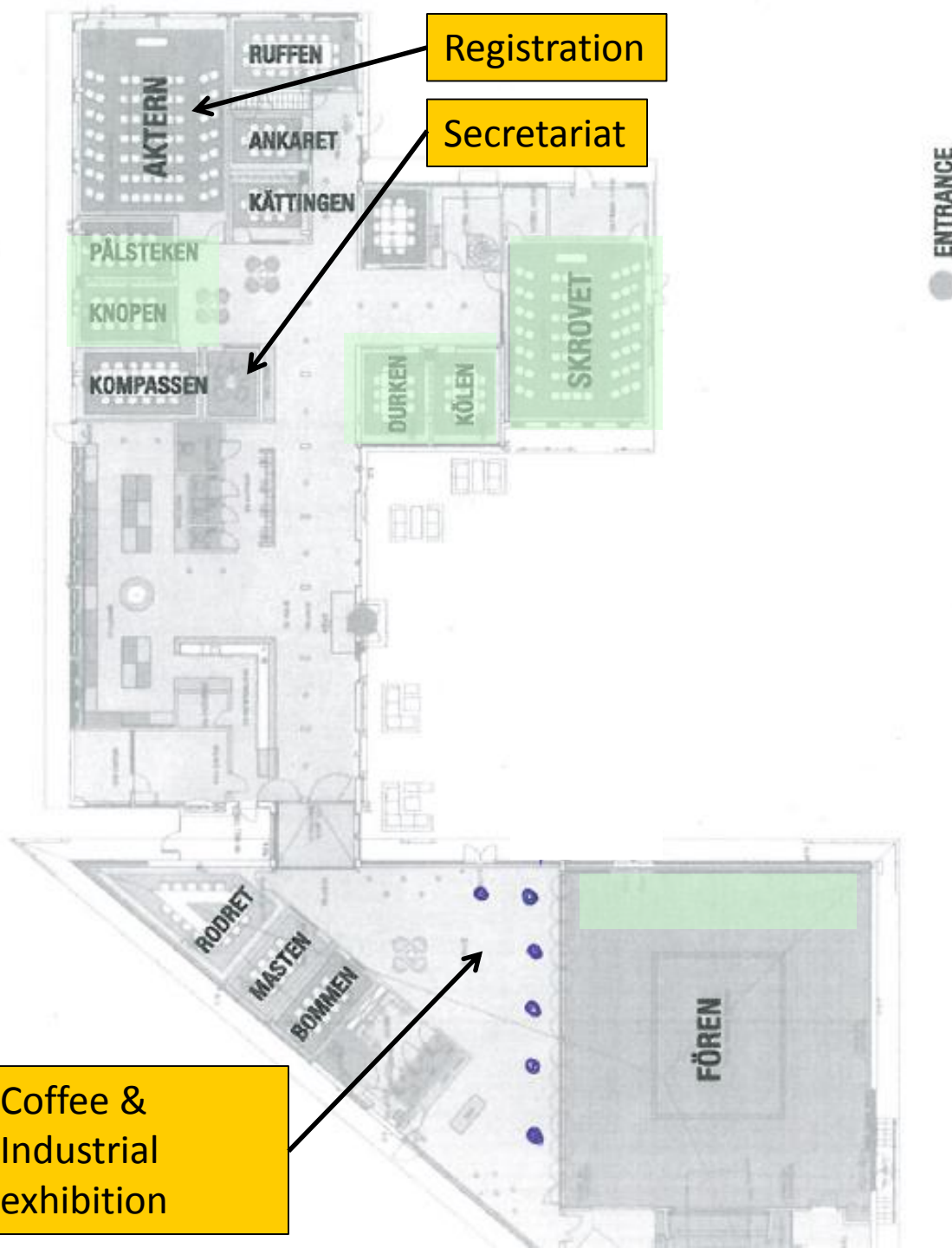
Group 4

First Name	Last Name	Institute
Oscar	Andujar	CERN
Mohammad	AL-Najdawi	SESAME
Simone	Callegari	CERN
Nikolaos	Chatzigeorgiou	CERN
Eric	Chevallay	CERN
Quentin	Deliege	CERN
Tobias	Eggert	TU Darmstadt
Michael	Gilg	MAX IV laboratory
Jakob	Hauser	DESY
Benjamin	Luethi	DECTRIS Ltd.
Alice	Michet	CERN
Thomas	Oliver	Lawrence Berkeley National Lab
Gregory	Pigny	CERN
Colette	Rosenberg	PSI
Pablo	Santos Diaz	CERN
Yongmei	Wen	Shanghai Institute of Applied Physics

Group 5

First Name	Last Name	Institute
Luca	Dassa	CERN
Artem	Galimov	JINR
Lucian-Mircea	Grec	CERN
Lucia	Lain Amador	CERN
Anton	Lundmark	European Spallation Source ERIC
Jaime	Perez Espinos	CERN
Saeid	Pirani	ESS
Nils	Plambeck	DESY Hamburg
Linus	Roslund	MAX IV Laboratory
Antonios	Sapountzis	CERN
Alban Rene Maurice	Sublet	CERN
Qisheng	Tang	Shanghai Institute of Applied Physics
Vahagn	Vardanyan	CANDLE
Gleb	Vorobyev	GSI
Neil	Warner	Diamond Light Source
Bo	Zhang	University of Science and Technology of China

Layout

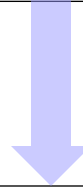


Tutorial	Room
Tutorial 1	Knopen + Palsteken
Tutorial 2	Kolen + Durken
Tutorial 3	Foren
Tutorial 4	EESTI (in the castle)
Tutorial 5	Skrovet

Barbara	Room
Registration	Aktern
Secretariat	Lanternan

Industrial support/presence

Company	Contact	Logo	Sponsor	Equipment	Lecturer	Exhibition
VAT	Ohri	YES	1	Valves	No	YES
Hiden	Wells	YES	1	RGA	No	YES
Leybold	Golsong	YES	1	Leak detect	No	YES
Pfeiffer	Everett	YES	1		Barfuss	YES
SAES	Maccallini	YES	2		Maccallini	YES
Agilent	Audi	YES	1		Maccarrone	YES
Edwards	Rislakki	No	0		Chew	YES



Name	Title	Affiliation	Country	Position	Sponsoring Company
Tobias Eggert	Mr.	Technical University Darmstadt	Germany	PhD Stud	SAES
Eliana La Francesca	Ms.	INFN-LNF	Italy	PhD Stud	VAT
Saeid Pirani	Mr.	ESS	Italy	PhD Stud	Hiden
Mostafa Salahshoor	Dr.	IPM	Iran	Post Doc	Pfeiffer
Vahagn Vardanyan	Mr.	CANDLE	Armenia	PhD Stud	Agilent
Bo Zhang	Dr.	University of Science and Tech	China	Engineer	Leybold

Excursion (on Sunday)

08:30 – Departure from Örenas Slott, Glumslöv (busses and ferry from Helsingborg to Helsingør, Denmark)

9:30 – arrival to Helsingør, Denmark

10:15 – Guided visits to Kronborg Castle start (3 groups every 15 minutes i.e.: 10:15; 10:30; 10:45). One tour lasts 1 h. Tour title: In Hamlet's world together with Hamlet live events.

12:00 – 14:00 Lunch break around Kronborg castle and Helsingør

Packed lunch from hotel

14:15 - departure from Kronborg Castle to Louisiana Museum of Modern Art (approx. 30 min drive)

15:00 – Arrival to Louisiana Museum, guided tour start (3 groups every 15 minutes i.e.: 15:00; 15:15; 15:30). Tour lasts 45 minutes.

17:30 - departure from Louisiana Museum to Örenas Slott.

To go or not to go ?
That is the question

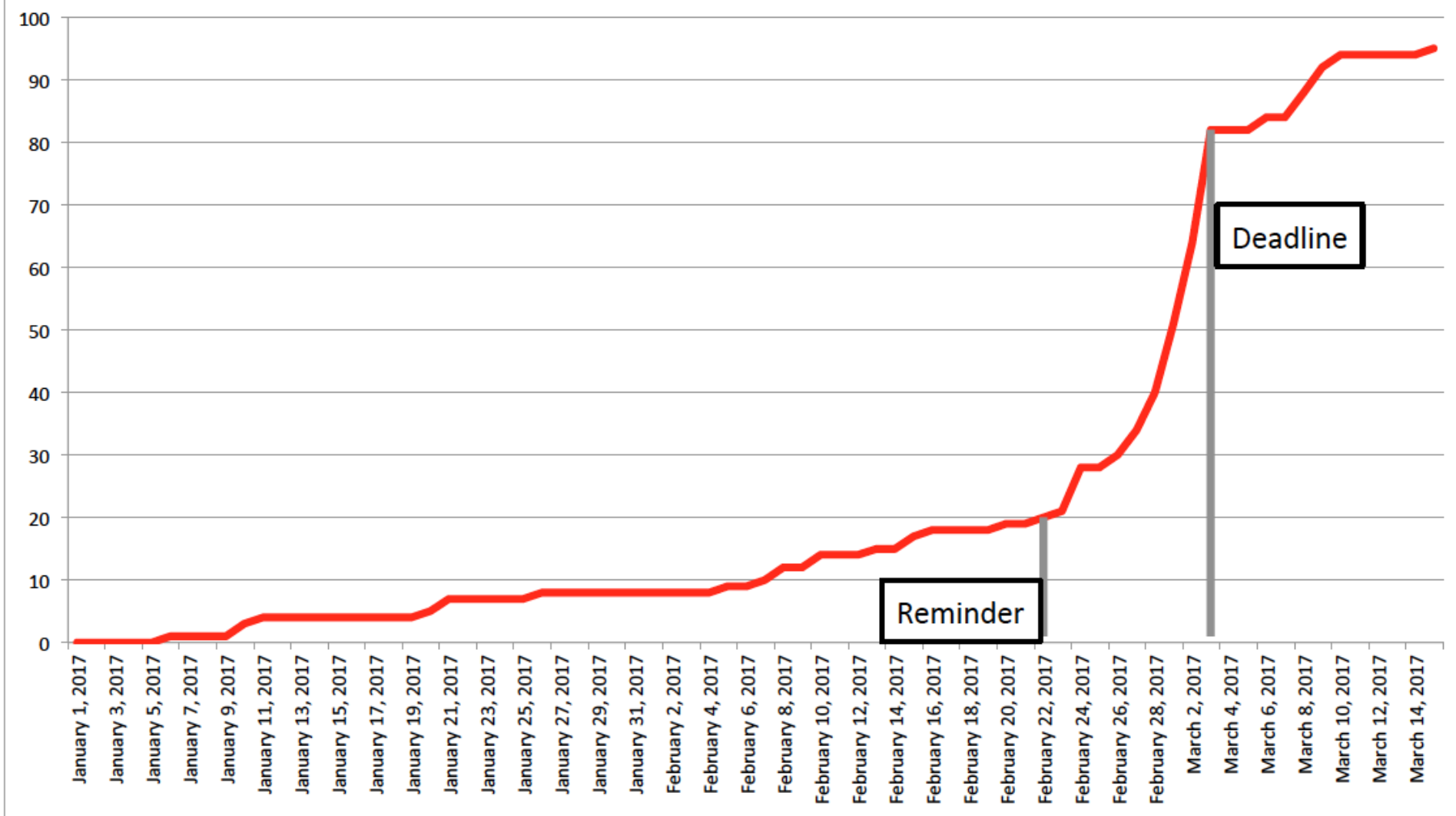
19:00 - arrival to Örenas Slott.

Visit to Max IV and ESS (on Tuesday)

- Depart 08.30
- Seminars on Max IV and ESS (at Max IV)
- Lunch at Max IV
- Visit Max IV machine
- Transport to ESS (short but essential)
- Visit ESS tunnel
- Restrictions during the tours
 - visitors should wear
 - **flat and closed shoes.** In particular, **no high heels.**
 - **trousers** (no skirts/dresses)
 - **no smoking** is permitted
 - **no bags or jackets or computers** should be carried
 - **furthermore they cannot be left** in the bus
 - it is allowed to **take photos**

Applications received (without funding requests)

Running Total of Registrations



Applications received

- So we had 96 applications when registration closed
 - Why did you apply so late ?
 - We selected 75, one of which could not come, so 74
- We also had 14 applications for funding requests
 - We selected 7, one of which could not come, so 6
- So quite a few were disappointed
- You should be 80 in total

Feedback

VACUUM FOR PARTICLE ACCELERATORS

6-16 June, 2017

Glumslov, Sweden

YOUR IMPRESSIONS OF THE PROGRAMME

Please mark each lecture with a number 1 to 5 in each of the three columns labelled "Level, Content and Presentation". The meaning of the numbers is as shown below. Please return this sheet to Barbara Strasser or Roger Bailey as soon as possible when completed. Your answers are confidential.

LEVEL	CONTENT	PRESENTATION
1 – Much too low	1 – Completely uninteresting	1 – Very poor
2 – Low	2 – Uninteresting	2 – Poor
3 – Just right	3 – Of some interest	3 – Fair
4 – Too high	4 – Interesting	4 – Good
5 – Much too high	5 – Very interesting	5 – Very good

- Please help us
- Very important
 - For CAS
 - For the speakers
- About
 - The lectures
 - The tutorials
 - The place
 - Anything else

TITLE	LEVEL	CONTENT	PRESENTATION
Introduction to Machine parameters			
Fundamentals of Vacuum Technology			
Impedance & Instabilities			
Materials & Properties I: Introduction			
Materials & Properties II: Thermal & Electrical Characteristics			
Materials & Properties III: Mechanical Behaviour			
Materials & Properties IV: Outgassing			
Vacuum Gauges I, II			
Mechanical Vacuum Pumps			
Computation for Vacuum System of Accelerators			
Getter Pumps			
Ion Pump Technology for Particle Accelerators			
Introduction to Cryogenics			
Cryopumping			
Industrial Vacuum Applications			
Beam Induced Desorption			
Beam-Gas Interaction			
Surface Characterisation			
Interactions between Beams and Vacuum System Walls			
Surface Cleaning & Finishing			
Thin-Film Coating			
Controlling Particles/Dust in Vacuum Systems			
Beam Induced Radioactivity & Radiation Hardness			
Radiation Damage and its Consequence			
Control & Diagnostic			
Vacuum Design Aspects			
Manufacturing & Assembly for Vacuum Technology			
The Real Life of Operation			
Challenges for Vacuum Technology of Future Accelerators			