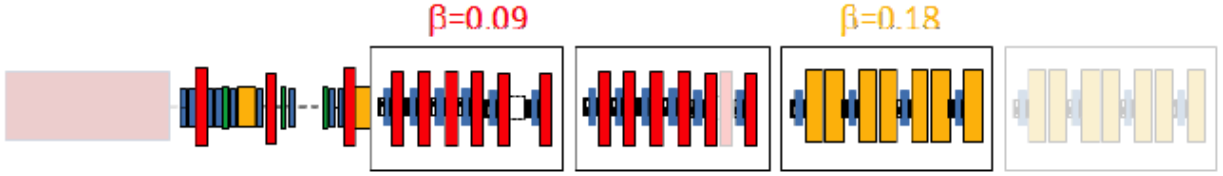
1 Slide 1 Minute

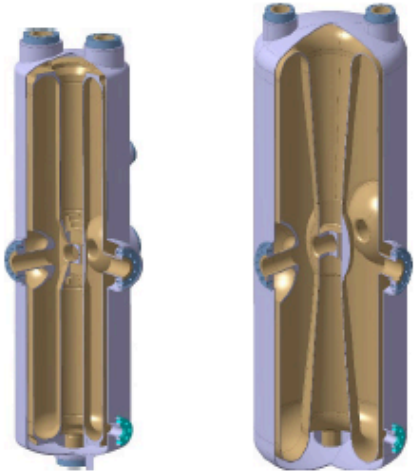
First	Name		First	Name
Lyes	Boudjaoui		Daniel	Harryman
Damien	Simon		Regina	Hess
Ozgur	Etisken		Anatolii	Kalamaiko
Johanna	Pitters		Jiri	Krai
Arto	Niemi		David	Posthuma de Boer
Hartmut	Ehmler		Anastasiya	Solodko
Simon	Cunningham		Adrian	Szeliga
Peter	Griffin-Hicks		David	Thompson
Andre	Pilan Zanoni		Erik	van der Kraaij
Simon	Stegemann		Luis Eduardo	Medina
Xinying	Zhang		Renjun	Yang
Eugenio	Senes		Daniel	Barna
Panagiotis	Asimakopoulos		Marc	Sos
Mancel	Barros Marin		Apostolos	Sounas
Laura	Grob		Patrick	Alexandre
Jochen	Ballof			
Nick	Mason		**Total**	**15**
Fabio	Rossi		**Total students**	**39**
Christoph	Wiesner			
Foteini	Asvesta		Roger	Bailey
Nuria	Ayala		Werner	Herr
Anna-Maria	Bachmann		Suzie Sheehy	Suzie Sheehy
Vera	Chetvertkova		Hermann	Schmickler
Francesco	Collamati			
Total	**24**		**Total lecturers**	**4**

DESIGN OF THE HWR CAVITIES FOR SARAF

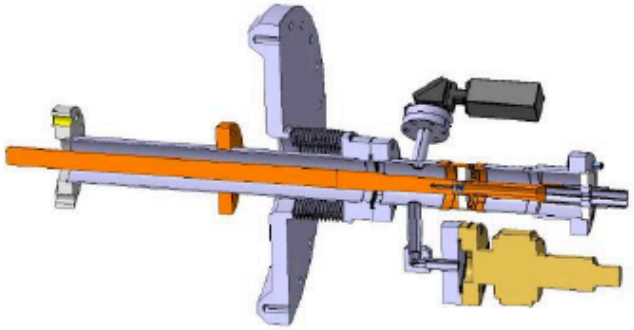
CEA is building a new accelerator facility for SARAF Phase II. A key element of the project is the superconducting linac at 40 MeV (deuterons) or 35 MeV (protons). The beam dynamics defines the maximum required accelerating voltage of the cavities, 1.0 and 2.3 MV, their $\beta\downarrow opt$, 0.09 and 0.18, their frequency 176.00 MHz.

12 (+1) HWR for low beta cavities.
7 (+7) HWR for high beta cavities.

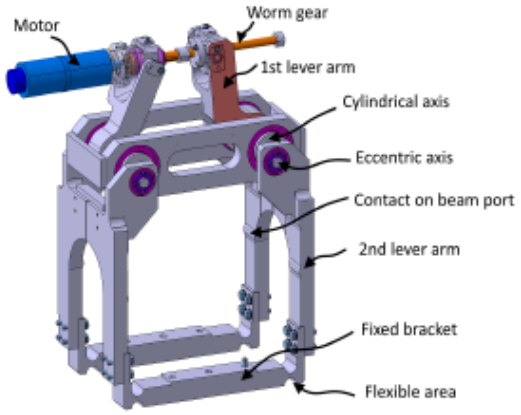




Low beta ***High beta***



Power coupler



Tuner

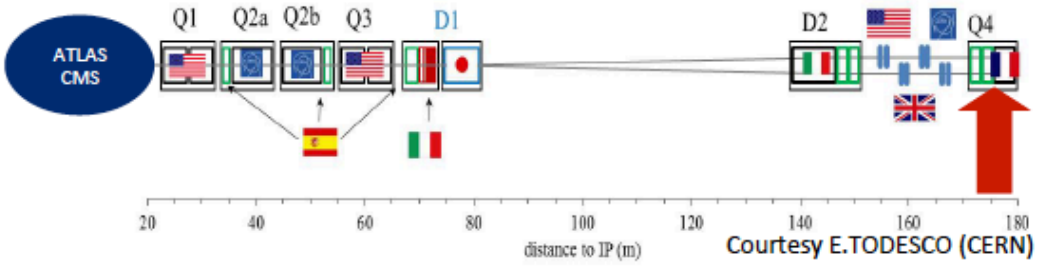
	Low β cav.	High β cav.
β_{opt}	0.091	0.181
Design E_{acc} (MV/m)	6.5	7.5
Epk_{max} (MV/m)	32.1	33.2
Bpk_{max} (mT)	60.9	60.5
Diss. Power@40nΩ (W)	6.16	14.4
R/Q @ β_{opt} (Ω)	189	280
Stored Energy (J)	4.9	14.4

- RF requirements: 5 kW (LB) and 11 kW (HB).
- External diameter: 36.8 mm.
- Matched to 50 Ohms at 176 MHz.

	Low β	High β
Acceptable Pressure (bar)	2.0	2.0
Pressure Sens. (Hz/mbar)	-7.4	3.3
BP sensitivity (kHz/mm)	653	157.7
Required BP Displacmt (mm)	0.15	0.63
Tuning Range (kHz)	0-100	0-100

MQYY: SUPERCONDUCTING QUADRUPOLE MAGNET FOR HL-LHC

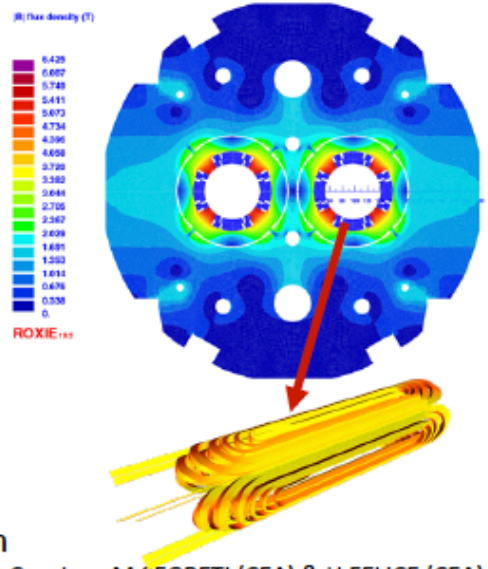
The MQYY magnet belong to the Insertion Region magnets delivering the particles beam to the CMS and ATLAS experiments.



Courtesy E.TODESCO (CERN)

MQYY characteristics:

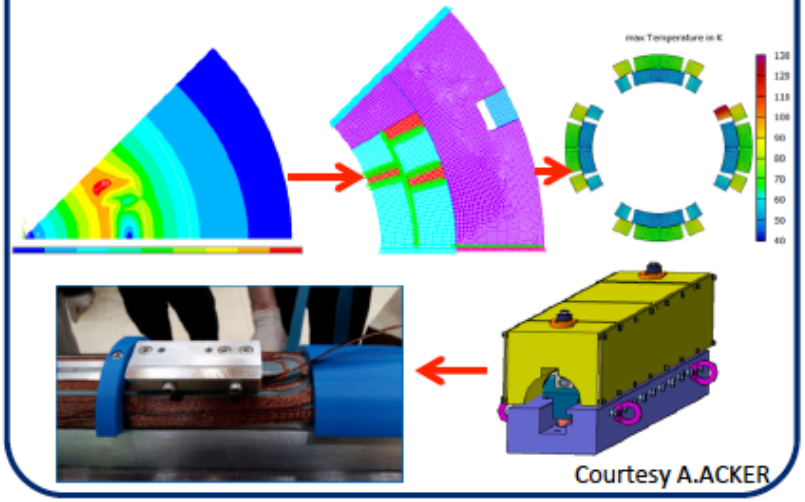
- NbTi Cos2θ Quadrupole with 2 layers
- Double Apertures of 90 mm
- Integrated gradient = 440 T
- Magnetic length = 3.67 m
- Nominal gradient = 120 T/m
- Temperature = 1.9 K
- Nominal current = 4590 A
- Stored energy = 0.81 MJ
- Peak field = 6.44T
- Yoke outer diameter = 614 mm



Courtesy M.SEGRETI (CEA) & H.FELICE (CEA)

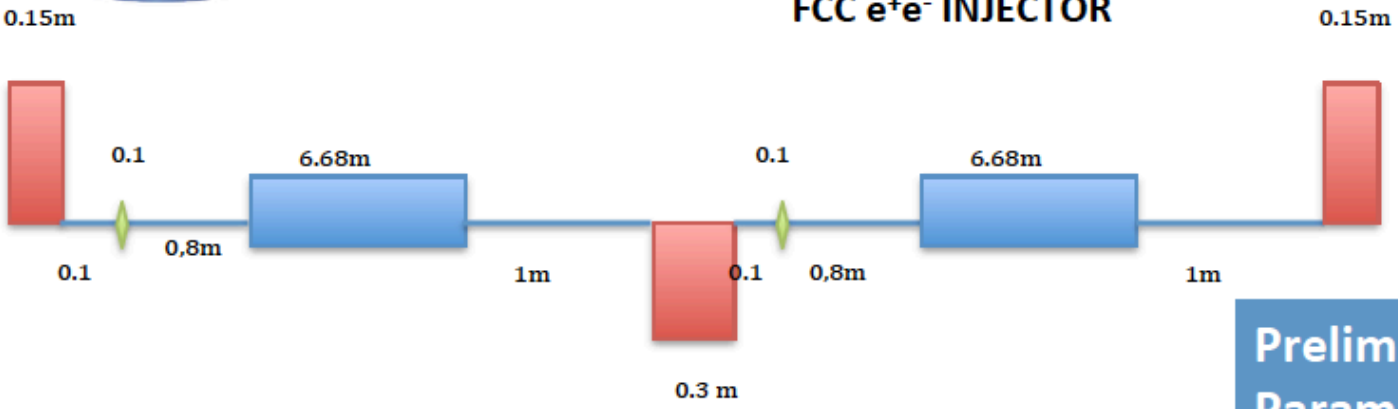
Design and manufacturing of the MQYY

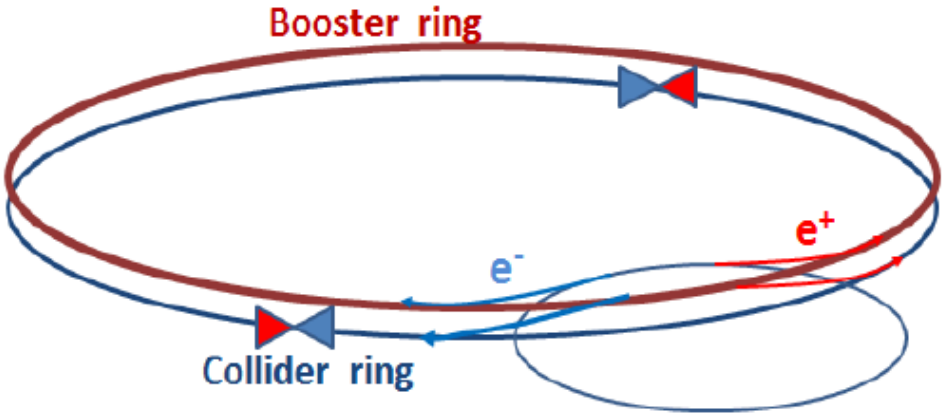
- Magnetic design and optimisation
- Mechanical design
- Quench protection studies
- Tooling design and manufacturing
- Mock-ups
- Magnet fabrication
- Tests (Warm and cold magnetic measurement, Training)
- Work with CERN on cryostating and integration in the accelerator



Courtesy A.ACKER

DESIGN STUDY of a Pre-Booster DAMPING RING for the FCC e^+e^- INJECTOR





Preliminary Parameters	@ 20 GeV
C (m)	2393.54 m
Emittance (nm.rad)	28.987
E. Spread	1.034
Chrom X	-44.195
Chrom Y	-42.358
Uo (keV)	51586.2

Özgür ETİŞKEN, Ankara University , Physics Department-PhD Student

Supervisors: Prof. Dr. Abbas Kenan ÇİFTÇİ (A.U) and

Dr. Yannis Papaphilippou (CERN)

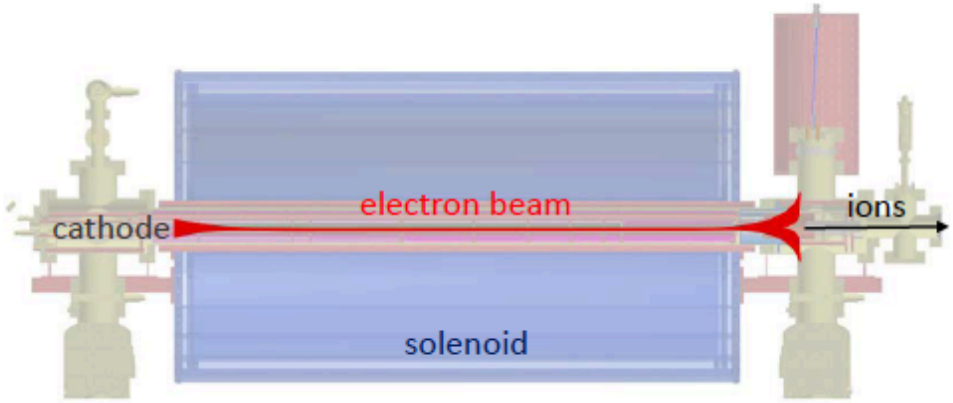
CAS 2016, Budapest, 02-14 October

Electron

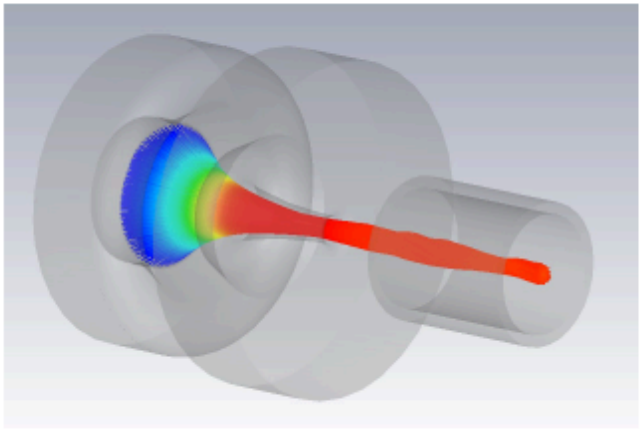
Beam

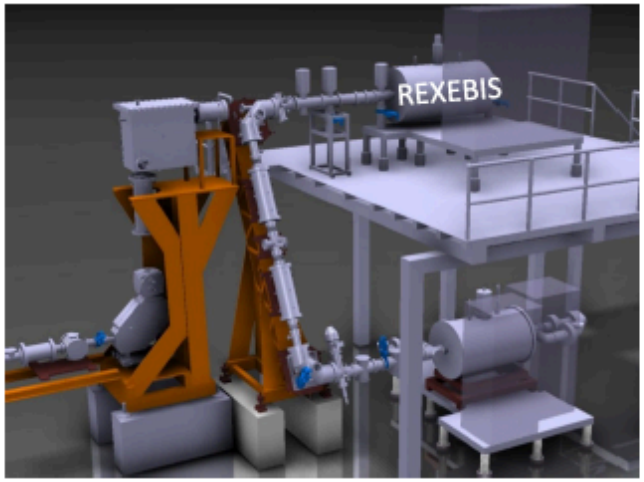
Ion

Source



MEDeGUN
rapid production of C^{6+} ions
for 2nd generation hadron therapy



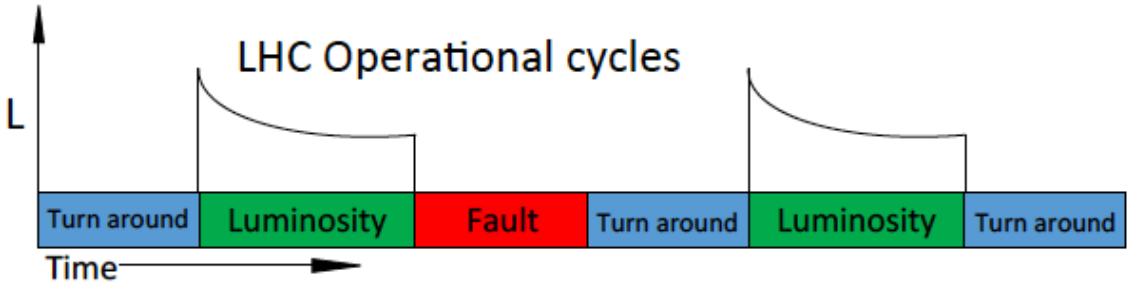


ISOLDE
charge breeding of
radioactive ion beams

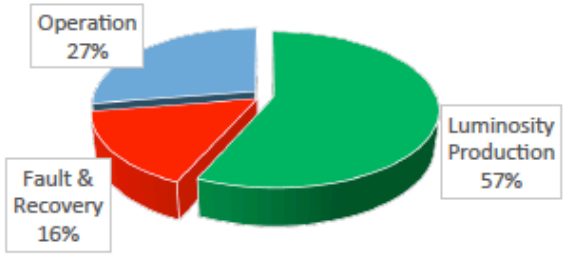
Johanna Pitters
BE-ABP-HSL

FCC Availability Study, Arto Niemi CERN

- FCC study: new 100 km long research infrastructure (4 x LHC)
- Feasible operations key to success
- Our Main task: modelling LHC availability
  - →FCC-hh availability goals
    - Collaboration TU Tampere and Ramentor Oy
- Interest: condition based maintenance



LHC Operational Statistics 7/2016



Come to see poster!

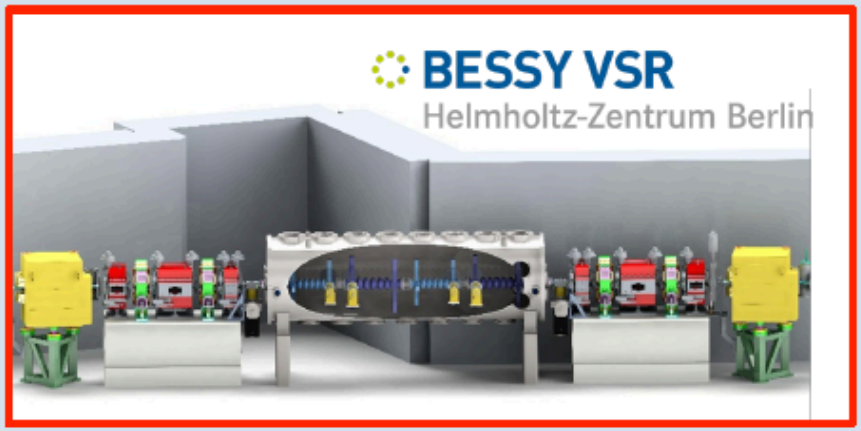
The management racetrack

Document control system

Action list

Work breakdown structure

Minutes



Progress report

Purchase Order

Budget

Schedule

Hartmut Ehmler

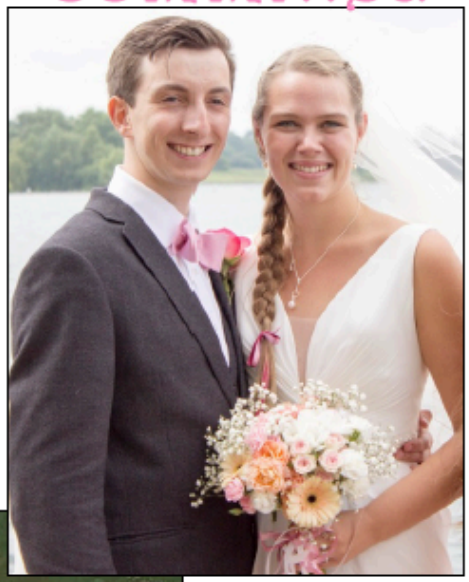
OPERATORS At The AUSTRALIAN SYNCHROTRON

- Set up and operate the synchrotron according to set parameters.
- Provide over 5000 Hours of beamtime/yr to users and industry, resulting in >350 papers/yr published.
- Fault resolution, resulting in >99% beam availability over the last three years.
- Beamline Support (443 faults resolved, 25 Beamline Scientist call outs)
- Maintaining/recording activities on in-house elog and wiki pages.
- Personal projects (Environmental monitoring, Master Status).

Peter Griffin-Hicks; Graduate Accelerator Physicist at ISIS

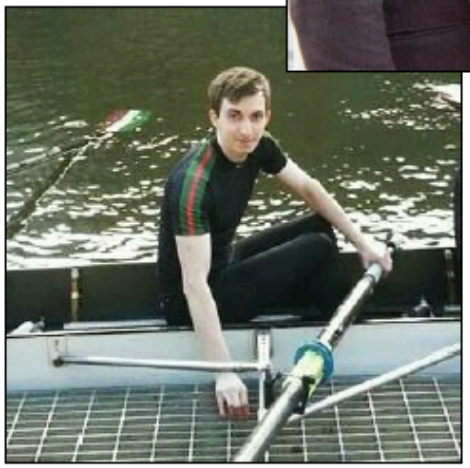
ADVENTUROUS

Committed

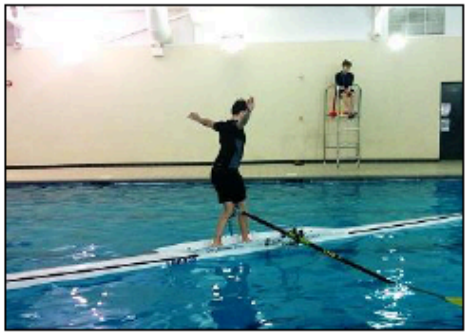


PRIORITISED

INGENIOUS



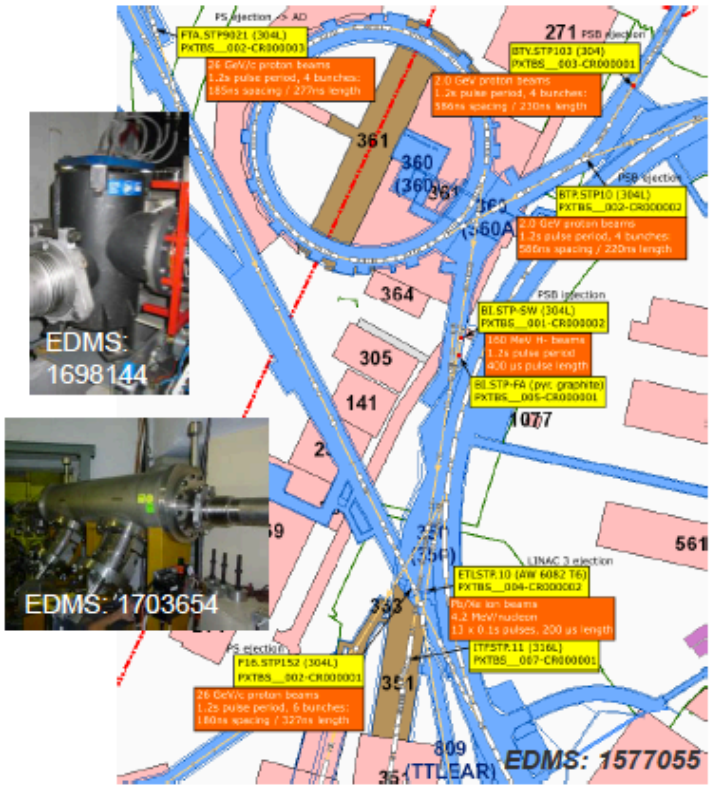
Dashing



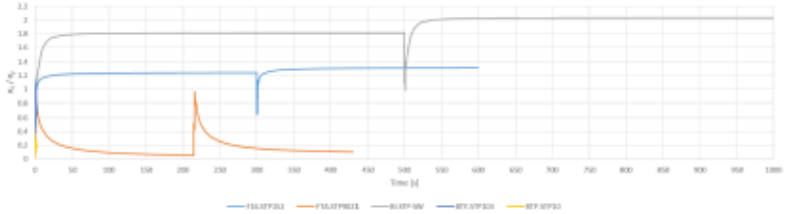
Talented

Science & Technology Facilities Council

#PS beam-stoppers #SPS scrapers #CHARM assemblies (André Pilan Zanoni)

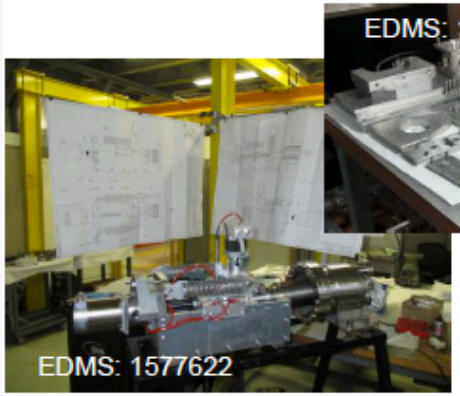


Design assessment of PS beam stoppers for LIU

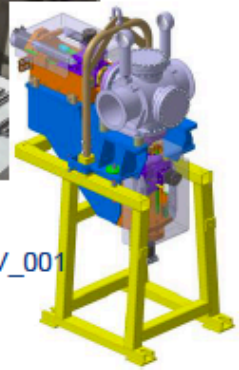


Thermo-structural analysis of their performance

Manufacturing and purchase of spare parts



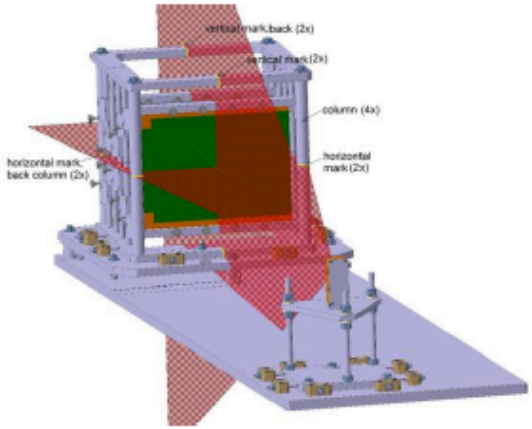
Assemblage and cabling of spare scraper modules



CCD: SPSBSHV_001

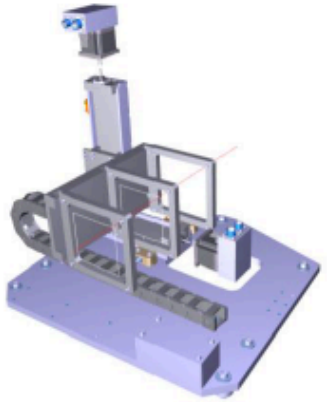
New version of SPS scraper

CHARM (East hall): Design, validation and assemblage of devices



Laser table for aligning PBC outside radiative areas

CCD: PS_HTMCA0001
EDMS: 1572063



XZ table: moves card during beam hit

CCD: PS_TMCS_0160
EDMS: 1572100

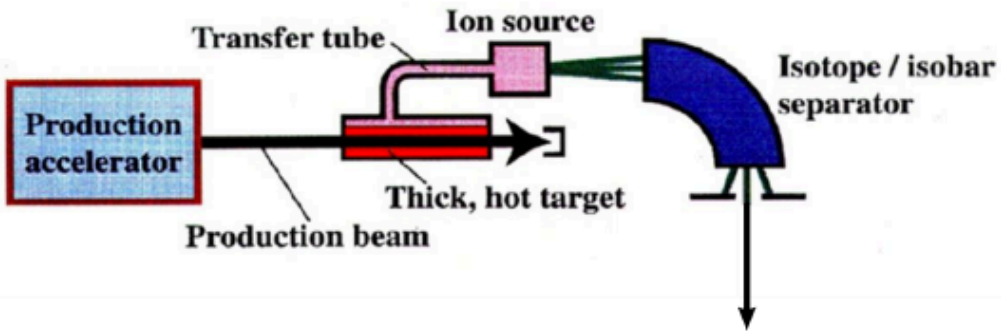
Production of mass separated ^{11}C-beams for PET-aided hadron therapy

- MEDICIS Project: Production of radioisotopes for medicine application

↳ ^{11}C based hadron therapy

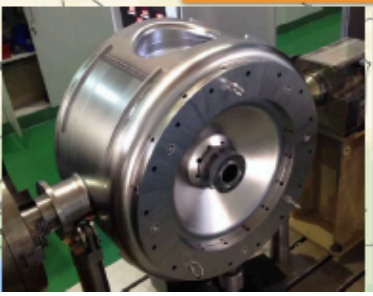
- My work:

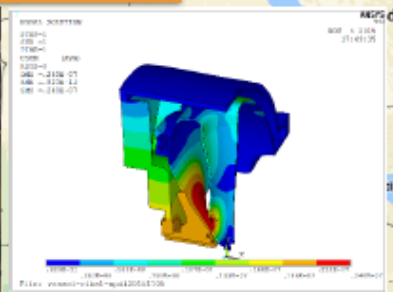
  The production scheme



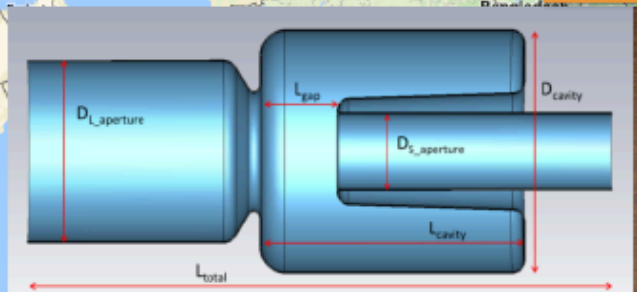
ZHANG Xinying (张新颖）
Ph.D. (06.2016)
Institute of High Energy Physics
Research interest: SRF cavity
Email: zhangxinying@ihep.ac.cn

325 MHz superconducting HWR
for Chinese Accelerator Driven Sub-critical System





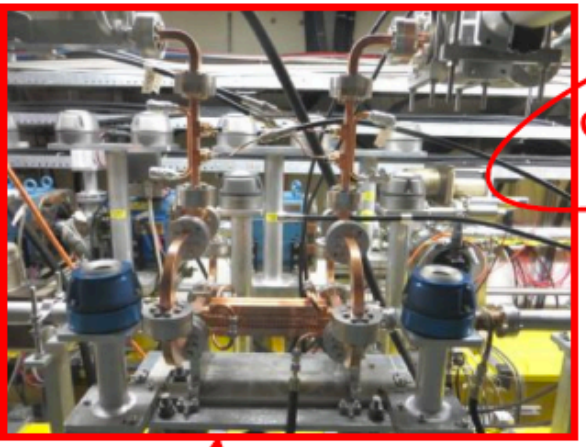
Spoke cavity



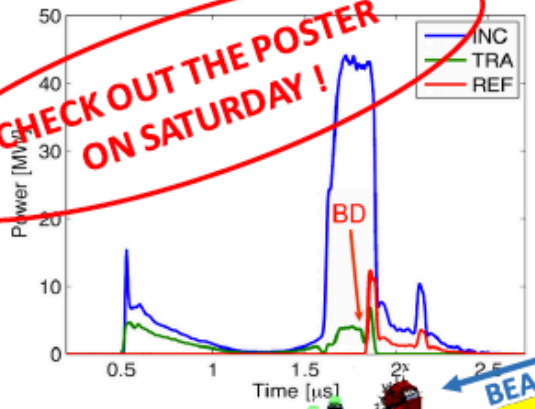
QWR

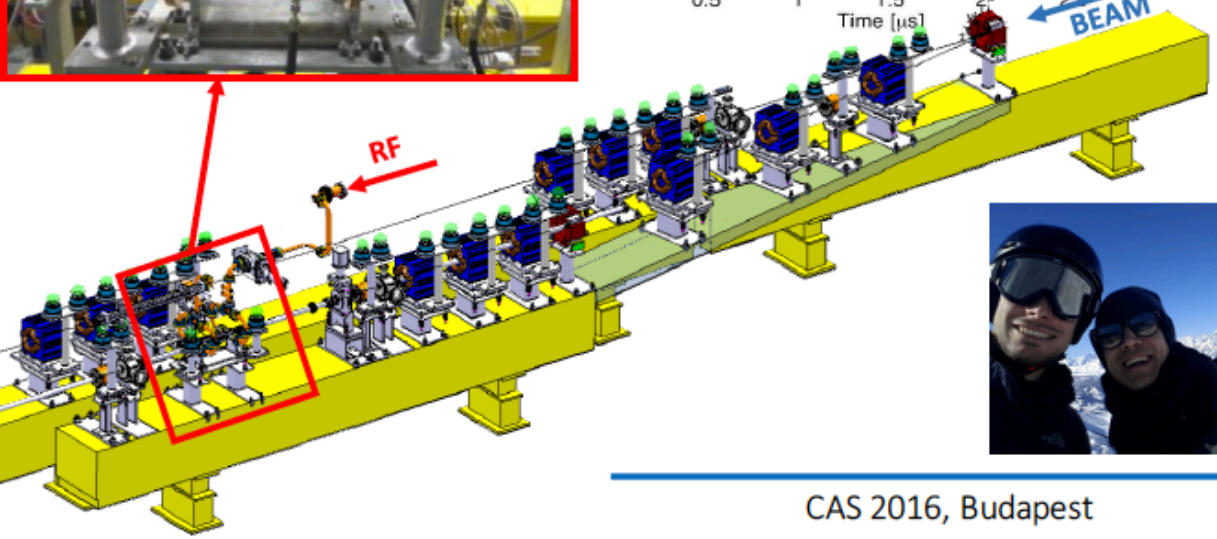
eugenio.senes@cern.ch

Eugenio Senes



CHECK OUT THE POSTER ON SATURDAY !





Present

technical student @ CERN
master student @ UniTo

Future

somewhere in accelerator physics (I hope !)

In life besides physics

A few words about me...

Panagiotis (Panos) Asimakopoulos

Background

- Coming from Greece 
- Graduated from Patras University & Chalmers University of Technology with MSc in Electric Power Engineering 

Affiliation

- Currently trying to be a  , working at CERN & Chalmers University of Technology
- PhD focus: Temperature monitoring and thermal stressing mitigation of IGBT-based magnet power supplies

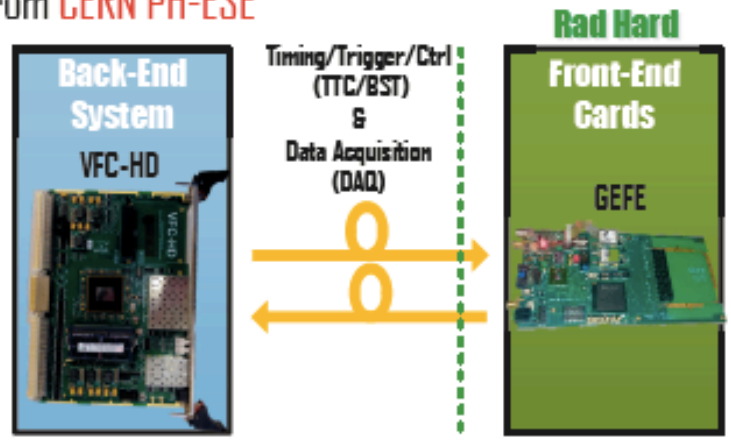
Hobbies


The GEFE project

Common Digital Front-End for Beam Instrumentation

The GEFE board

- General purpose FPGA-based radiation tolerant board
  - Rad-Hard FPGA ProAsic3 (ACLA3PE3000-FGG896) from Microsemi
  - Rad-Hard high-speed (4.8 Gbps bidirectional) GBT-Versatile Link from CERN PH-ESE
  - Optical & Electrical interfaces (FMC HPC, etc.)
- Target Total Ionizing Dose (TID): up to 750 Gy



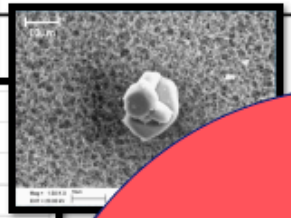
Status & Outlook

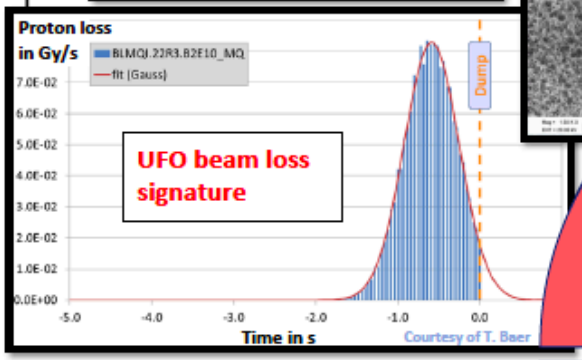
- The GEFE board
  - Validity test of the first 2 prototypes of GEFE v1 (**November 2015**)
  - Rad-Hard qualification of **components (Second half of 2015)** and **full board (First half 2016)**
  - Pre-production stage (**First half of 2016**) (small orders for prototyping)
  - Production stage (**First half of 2017**)
- The GEFE community
  - Open HardWare Repository (OHWR) Wiki and Email Lists
  - 3 projects involved and 6 interested so far (New MOPOS SPS, Wire-scanner, CHARM, New WorldFIP, etc.)
  - More than 350 pieces requested

UFOs in the LHC

Laura Grob — laura.grob@cern.ch

SPONSORED BY THE
Federal Ministry of Education and Research





UFO Facts

UFO Mysteries

origin

chemical composition

dynamics

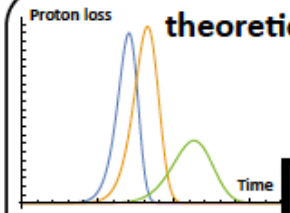
driving forces

mitigation

UFO BUSTERS

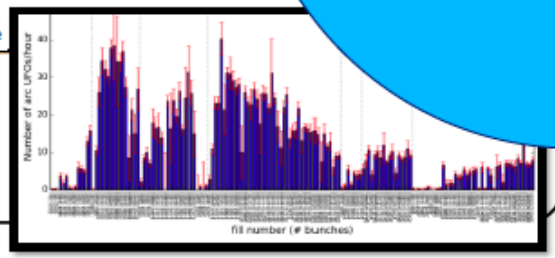
Correlations

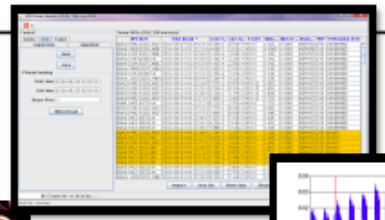
UFO Busting

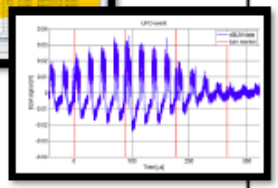


theoretical modelling

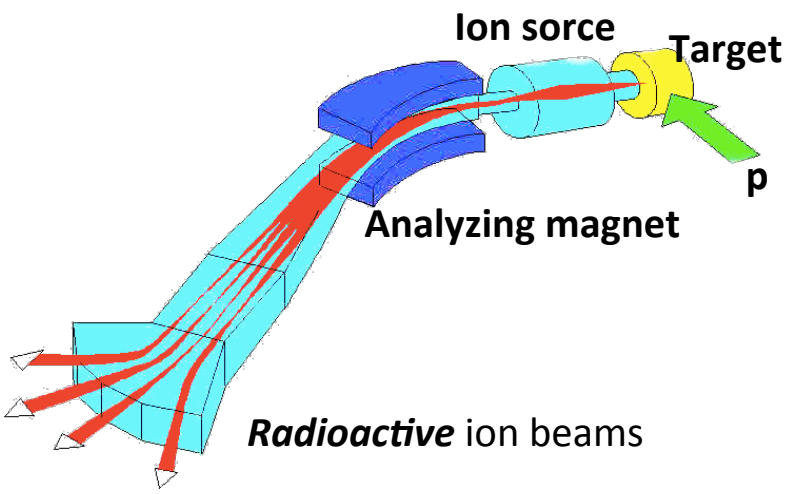
UFO statistics







Carbonyl beams of refractory elements for CERN-ISOLDE



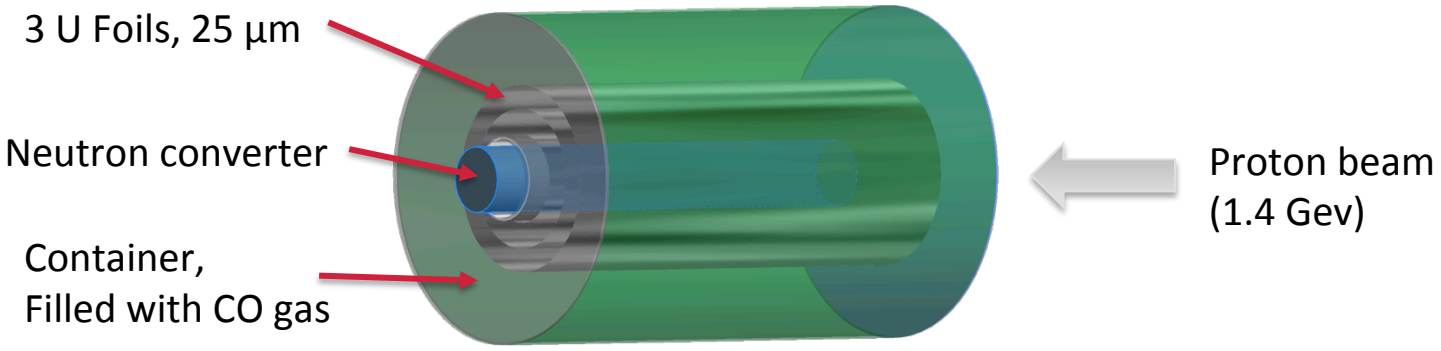
Refractory element beams are not available
-> in-situ volatilization Mo + CO(g) -> $Mo(CO)_6$

1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	71 La...	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn

Available beams

Forms Carbonyl

Target concept



J. Ballof, T. Stora,
Ch. E. Düllmann

Nick Mason

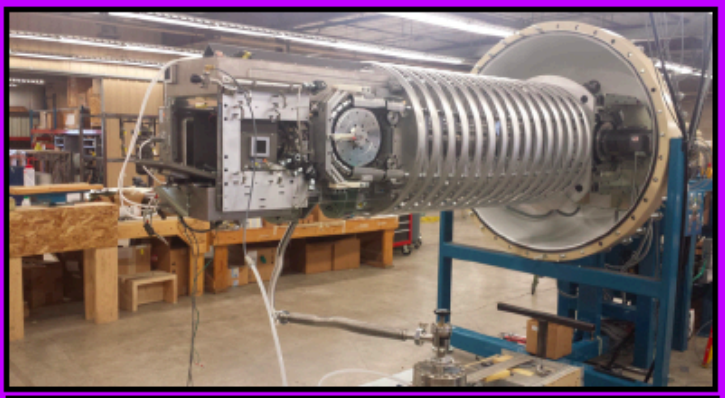
Ion Accelerator Experimental Officer

Dalton Cumbrian Facility, Cumbria, UK

MANCHESTER 1824

The University of Manchester
Dalton Nuclear Institute

5MV Tandem Pelletron.

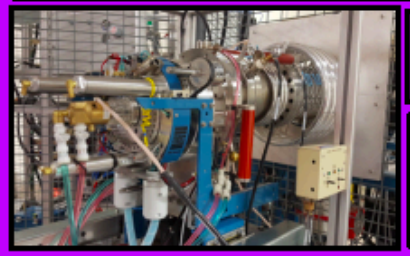


2.5MV Single-Ended Pelletron.

Ph.D. Research:

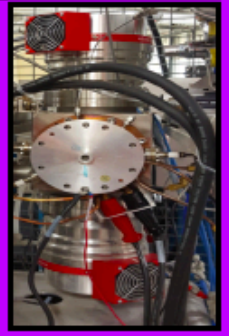
Ion Source Development: Understanding and Improving the Output of a Sputter Source

This project seeks to improve the SNICS Source output to higher current yields by modifying either the design of the source itself or the cathodes used to produce the beam.



← SNICS
Heavy Ion Source

TORVIS →
Gas - Plasma
Ion Source

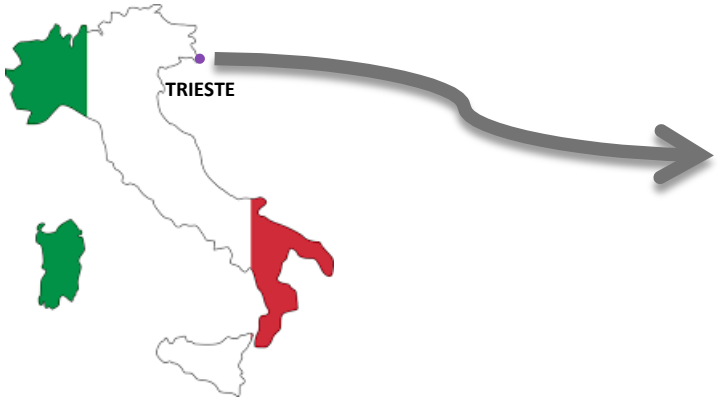


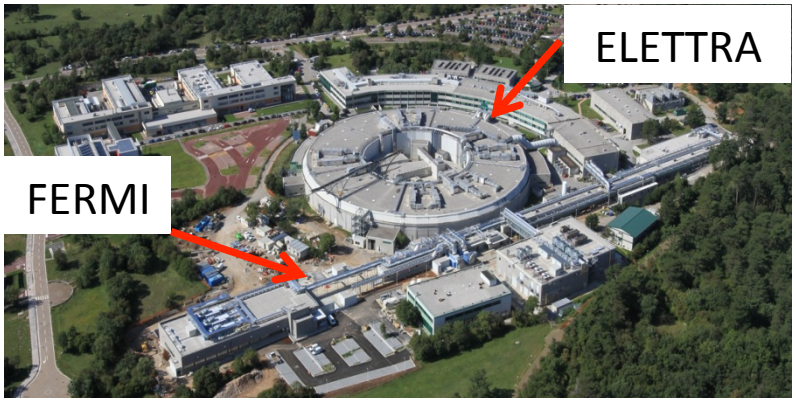
Facility Research:

- Materials (Predominantly for Nuclear Reactors)
- Radiochemistry
- Device Testing

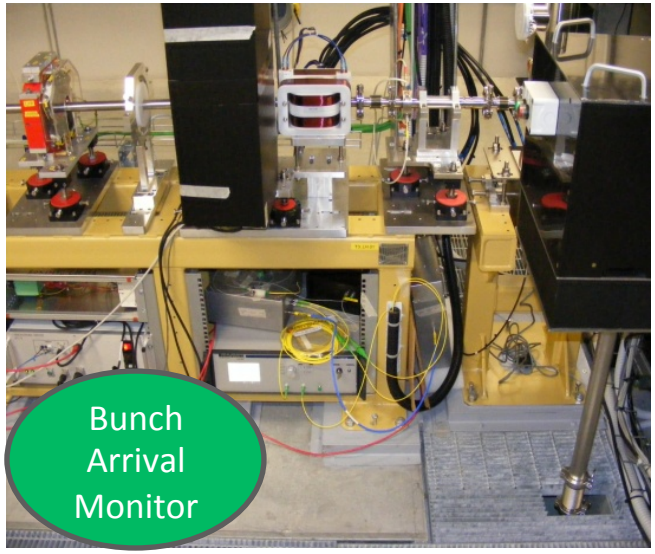
Fabio Rossi

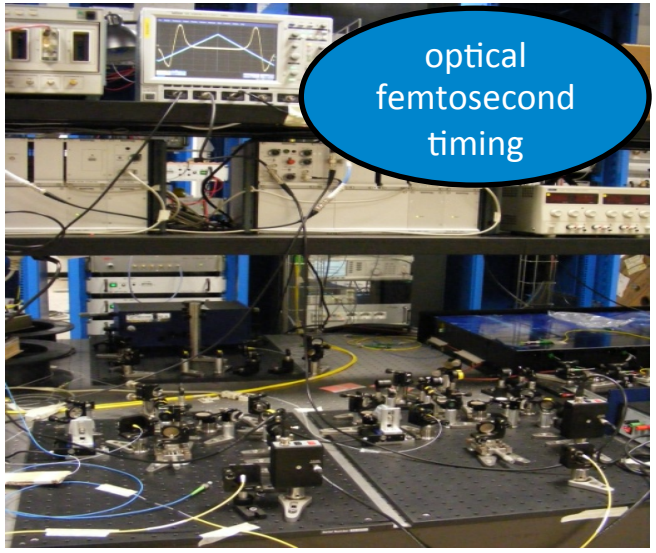
opto-electronic engineer
@ Elettra-Sincrotrone Trieste





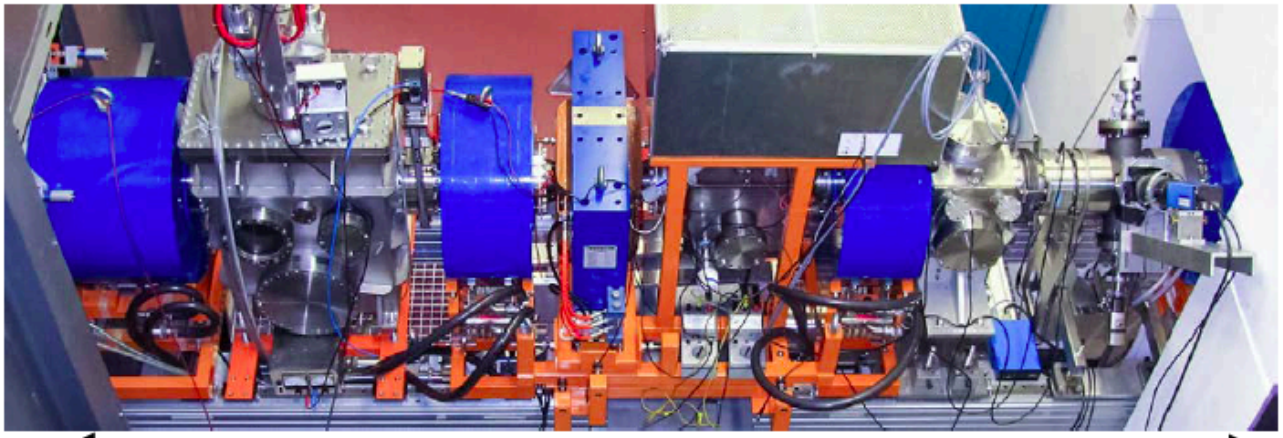
CURRENT ACTIVITIES RELATED TO FERMI LIGHT SOURCE



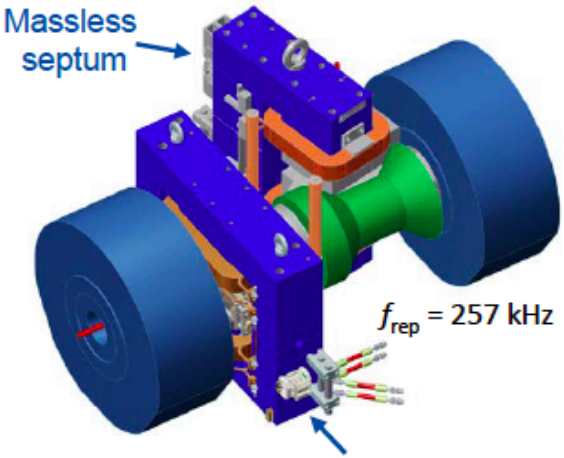


Ph.D., Frankfurt Univ.: “Chopping and Transport of High-Intensity Ion Beams”

Low Energy Beam Transport Line of the FRANZ facility (p, 120 keV)



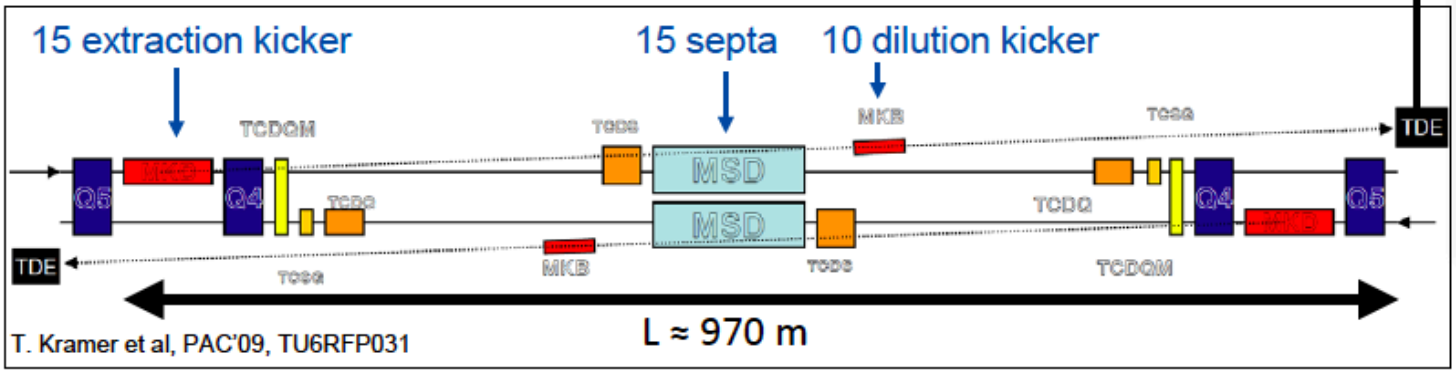
L = 3.7 m



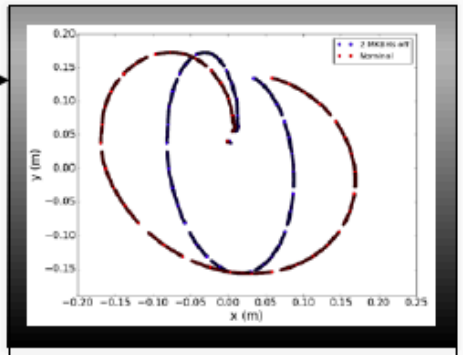
E×*B* chopper:
Static *B* field meets pulsed *E* field

Since June 2016: CERN Fellow (TE-ABT-BTP) for HL-LHC

LHC dump line (p, 6.5 TeV)



T. Kramer et al, PAC’09, TU6RFP031



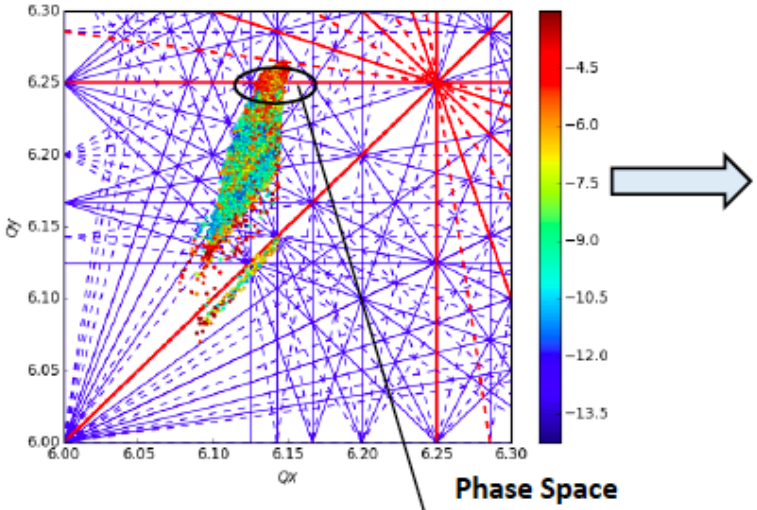
Simulated beam pattern at dump:
nominal and with 2 MKBH failing.

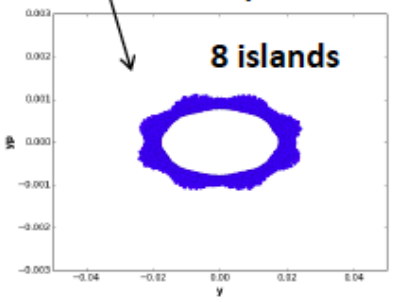
Upgrade of dump system? Add additional MKDs/MKBs? Failure scenarios? Asynchronous dumps?

Frequency map analysis for PS

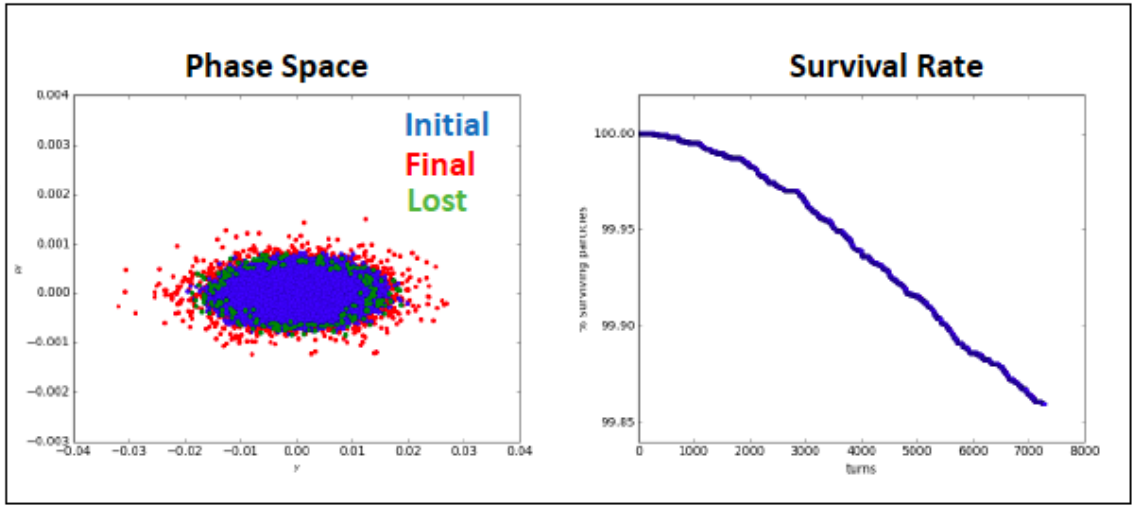
F. Asvesta, H.Bartosik, Y.Papaphilippou

Space charge driven 8th order structural resonance





PS configured for LHC 25ns beam
Working Point: Qx = 6.18, Qy = 6.28
PS lattice without any non-linearities
Simulations in PyOrbit under Space charge



- **Frequency map analysis with space charge** for **on and off momentum particles** clearly show the 8th order structural resonance observed by R.Wasef et.al
- Association of the resonance with losses, halo effect and emittance growth

ALBA Synchrotron Light Source

Nuria Ayala

Operation of the accelerators

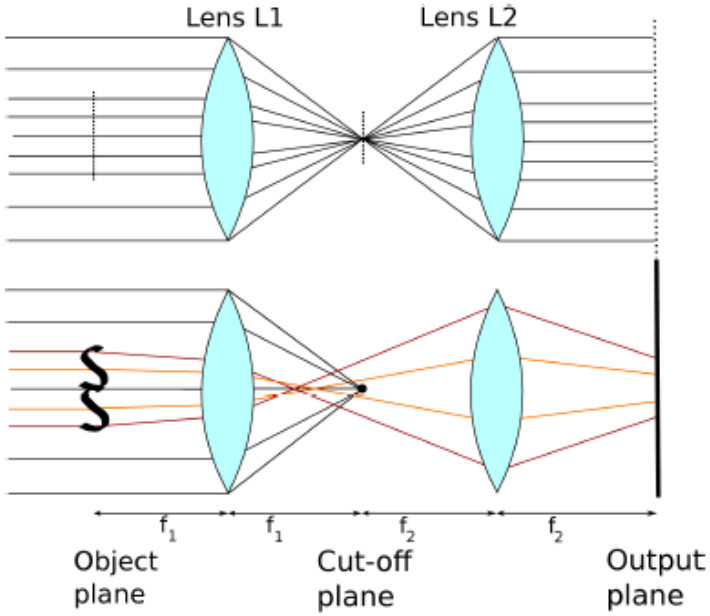
- Participate in machine studies
- Prepare and maintain the beam for users (beamlines)
- Interact with different subsystems

Pulsed Magnets

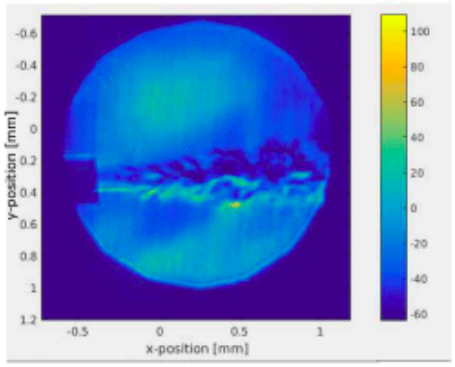
- ALBA has 10 Pulsed Magnets
  - 3 Septa
  - 6 Kickers
  - 1 Pinger (Diagnostics)
- Maintenance & Improvements: Injection Bump, ADC acquisition

Plasma Radius Measurement using Schlieren Imaging

Basic Principle



Images of air nozzle



Refractive index

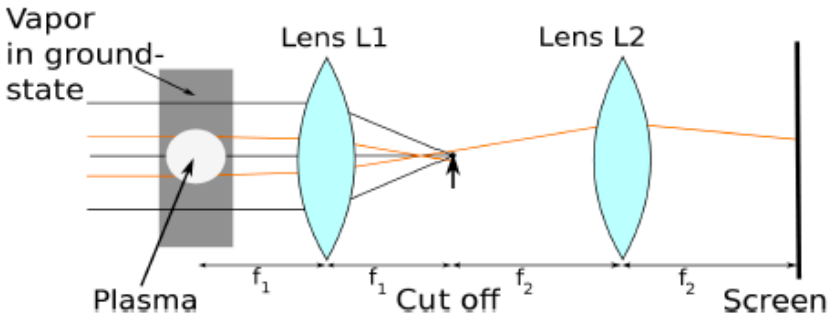
- for vapor

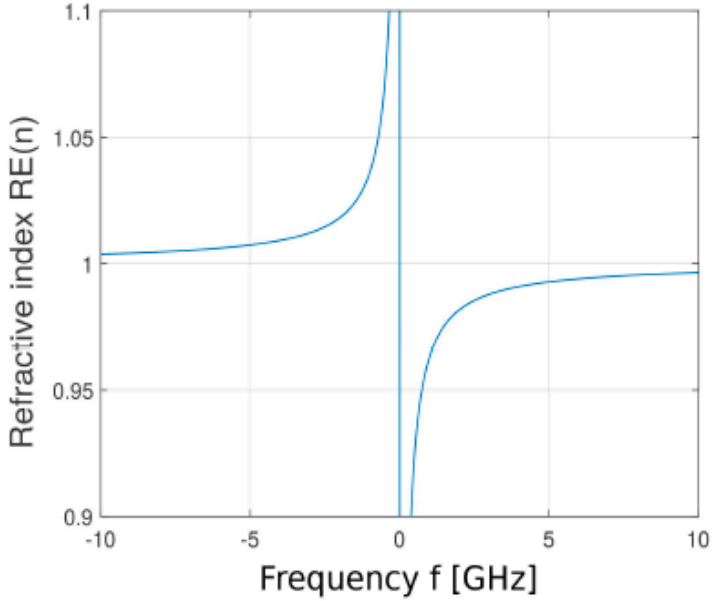
$$n(r)=\Re\left(\sqrt{(1+\frac{N_i(r)e^2}{\varepsilon_0 m_e}\Sigma_{i\neq j}\frac{f_{ij}}{\omega_{ij}^2-\omega-\frac{i\omega}{\tau_{ij}}})}\right)$$

- for plasma

$$n=\sqrt{(1-\frac{\omega_{pe}^2}{\omega^2})}$$

Plasma Radius Measurement



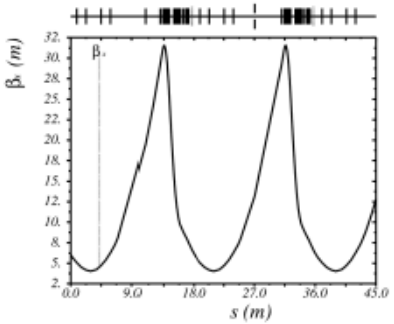


Work

Motivation:

$$\sigma(s) = \sqrt{\frac{\varepsilon_n}{\beta_{rel}\gamma}\beta(s)}$$

- Higher ε_n larger beam
- Acceleration: smaller beam
- Larger β: larger beam



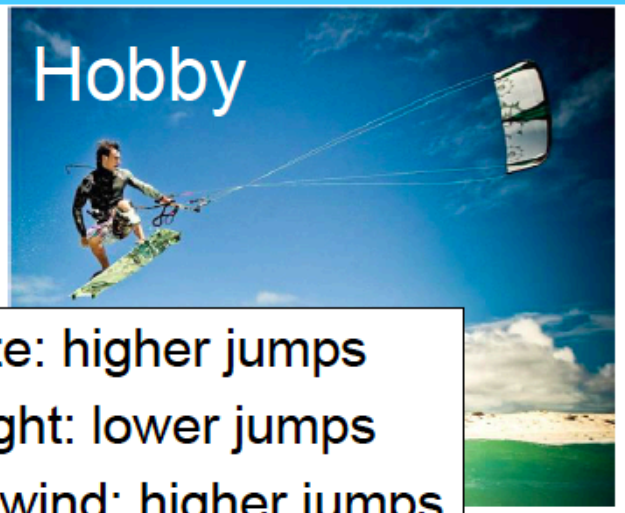
➢ β beating: difference of actual and nominal β

➢ Beam size too big => losses!!!

Task:

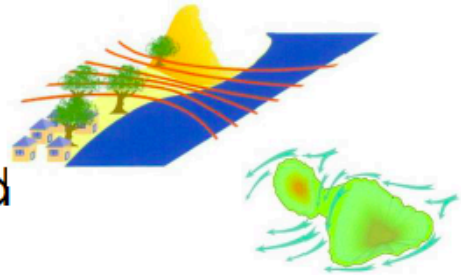
- Estimate expected β beating
- Develop strategies for mitigation

Hobby

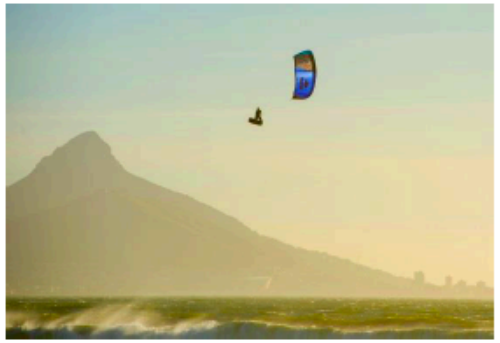


- Bigger kite: higher jumps
- Gain weight: lower jumps
- Stronger wind: higher jumps

➢ Gust: sudden, brief increase in speed of wind



➢ Too high uncontrolled jumps: danger!!!



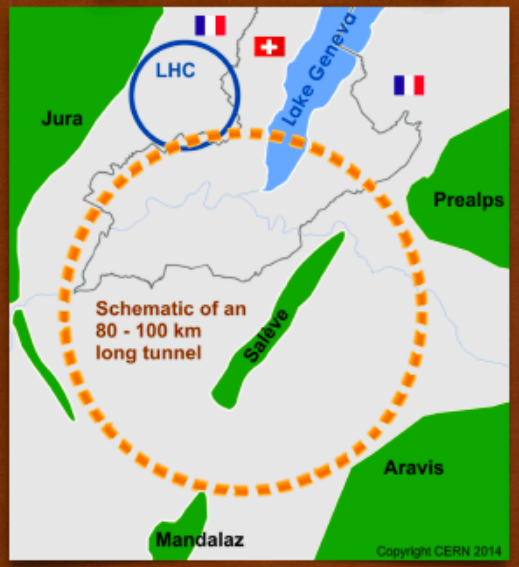
v.chetvertkova @gsi.de

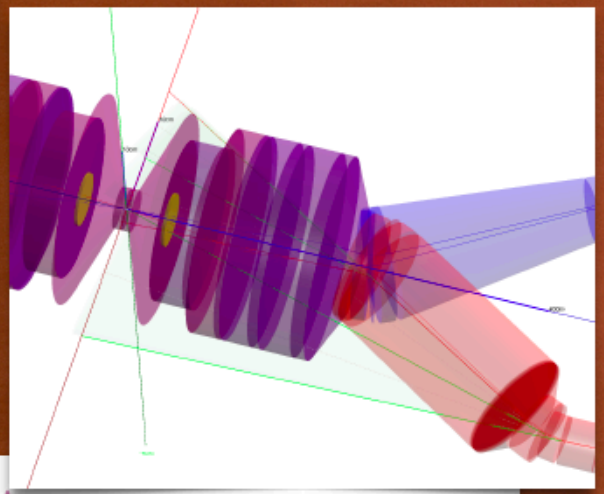
SYNCHROTRON RADIATION CONTRIBUTION IN THE INTERACTION REGION FOR FCC-HH

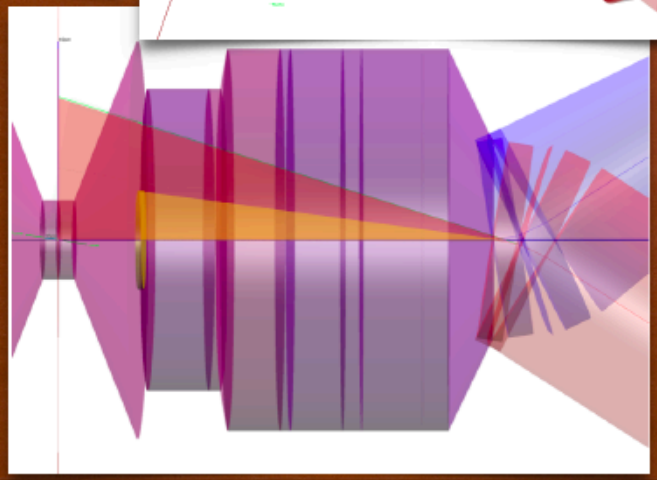
Francesco Collamati, INFN Frascati

Future Circular Collider study @CERN

- 100 km length
- 100 TeV CM Energy protons







AT SUCH HIGH ENERGIES S.R. START TO BE SIGNIFICATIVE EVEN FOR PROTONS!

$E_{FCC} \approx 7 \times E_{LHC}$

$PSR_{FCC} \approx 170 \times PSR_{LHC} \approx 10\ W$

$E\gamma_{FCC} \approx 100 \times E\gamma_{LHC} \approx 1keV$

X-Rays U.V.

HOW MANY PHOTONS ARE PRODUCED?

HOW MANY ENTER THE IR?

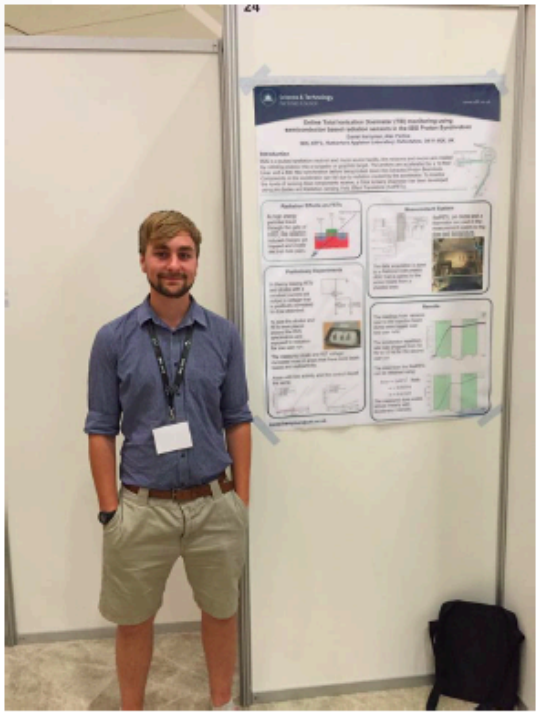
WHICH POWER LOAD ON THE BERYLLIUM PIPE?

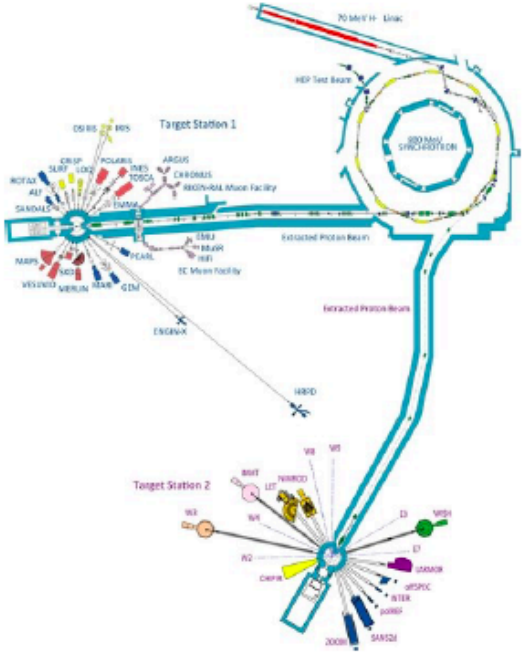
francesco.collamati@lnf.infn.it

Science & Technology Facilities Council
ISIS

Daniel Harryman – UK

- Electronic Engineer
- ISIS Beam diagnostics
- Rides bikes a lot
- Level 17 Fort builder

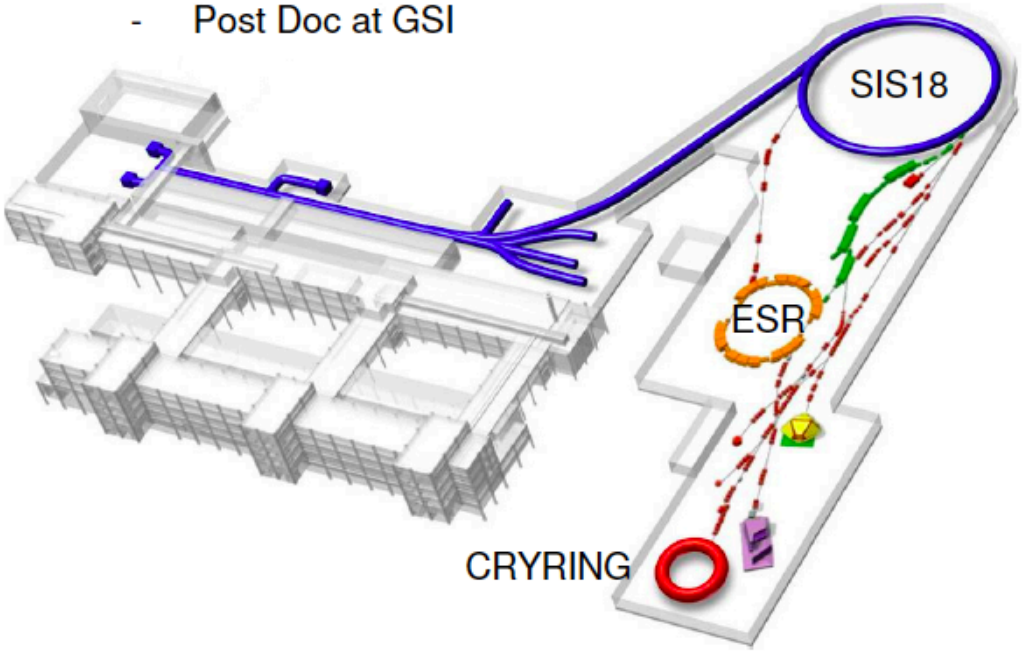




Regina Heß - Beam Cooling, Physicist

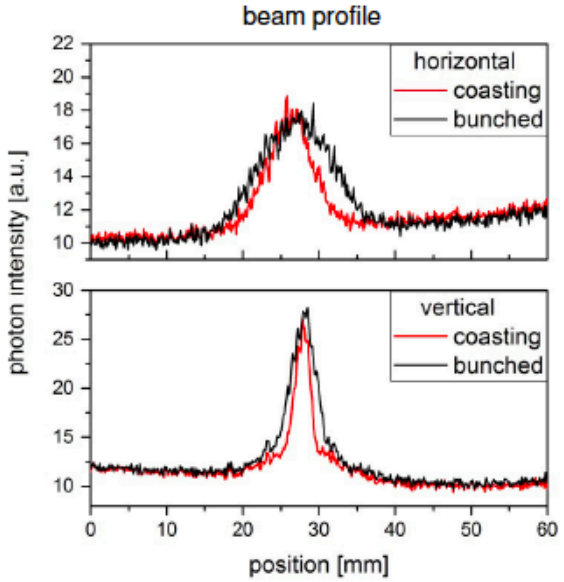
Education in atomic physics with highly charged heavy ions:

- 2005 Master thesis at GSI
- 2009 PhD thesis at GSI
- Post Doc in Paris (INSP,UPMC)
- Post Doc at GSI



Now, beam cooling department:

- Operation and maintenance of the GSI electron coolers
- Storage ring operation
- Beam profile and bunch length measurements



K I P T

NESTOR project

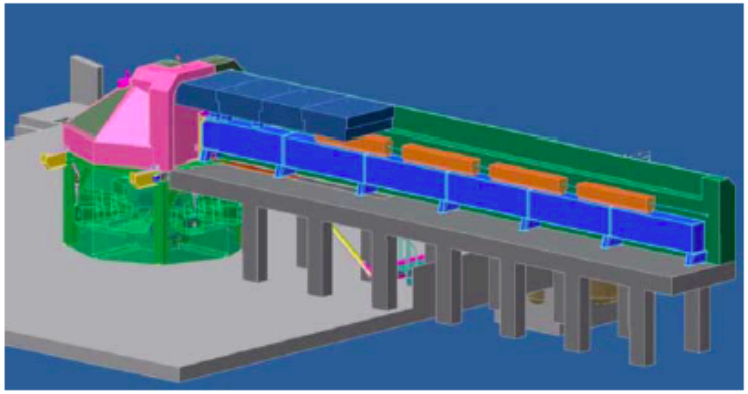
The X-ray source NESTOR based on the Compton scattering of intense laser beam on low-energy relativistic electron beam is under design and development in NSC KIPT.

Lattice group

- ❑ Design of injection channel.
- ❑ Lattice optimization of middle energy (40-225MeV) electron storage ring.
- ❑ Development of correction system for storage ring and transport channel.
- ❑ Simulation of beam orbit displacement in the storage ring due alignment errors.
- ❑ Development of special focusing mode without pulsed magnet for the first turn.

Nuclear subcritical assembly

The neutron source based on a subcritical assembly driven by a 100 MeV/100kW electron linear accelerator is under construction in NSC KIPT.



RF group

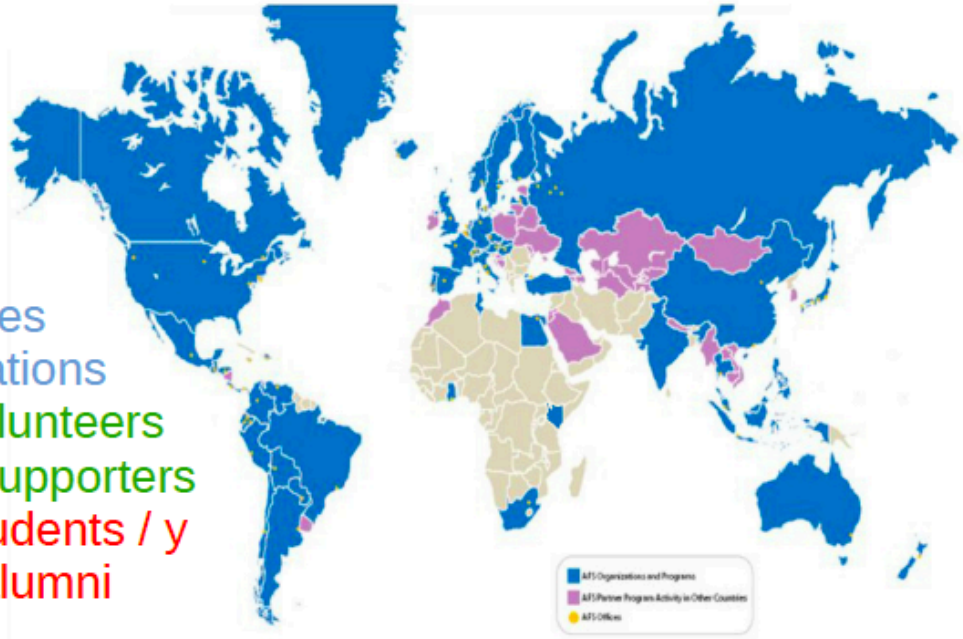
- ❑ Night shifts for commissioning of the klystrons

Lattice group

- ❑ Beam dynamics simulation in transport channel from Linac to Nuclear reactor.
- ❑ Simulation of beam orbit displacement in the channel due alignment errors of magnetic elements.

AFS intercultural

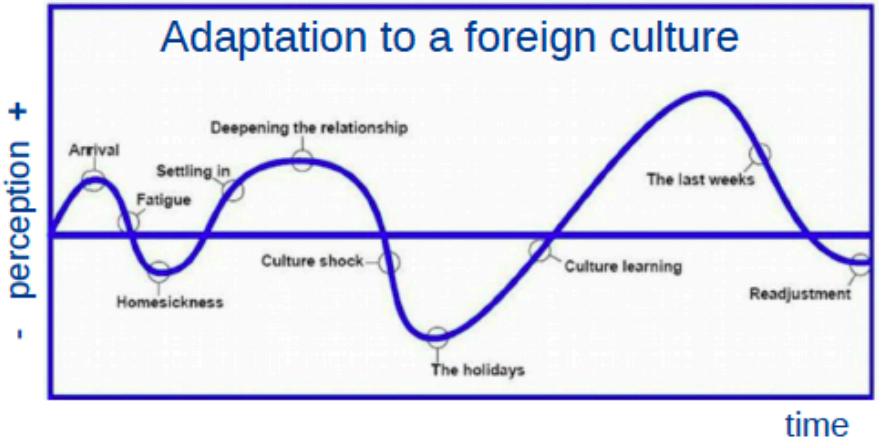
”We have to get to know each other better in the future, if the future is to be the way we want.“



59 countries
80 destinations
40 000 volunteers
100 000 supporters
13 000 students / y
450 000 alumni

AFS is a non-profit organization that provides intercultural learning opportunities through exchange stays of mainly high school kids, to create a better and safer world.

http://www.afs.org



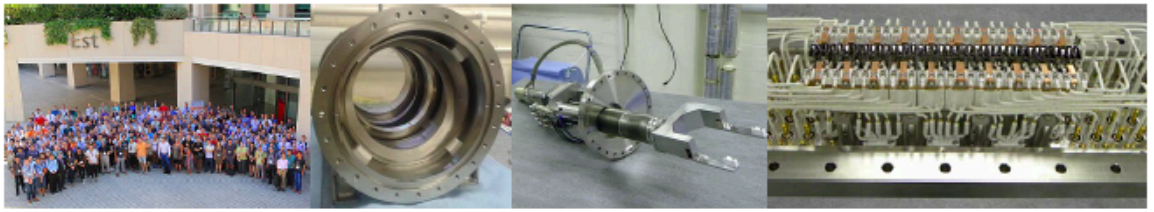
Science & Technology Facilities Council

MANCHESTER 1824
The University of Manchester

ISIS

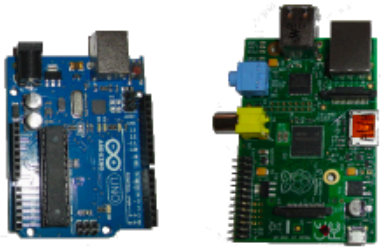
MPhys Physics

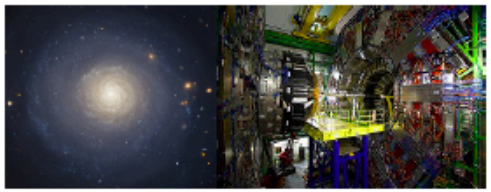
Beam Diagnostics



David Posthuma de Boer

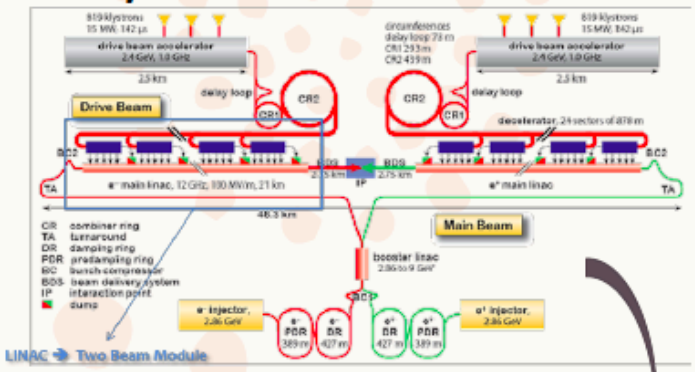
Diagnostics Physicist

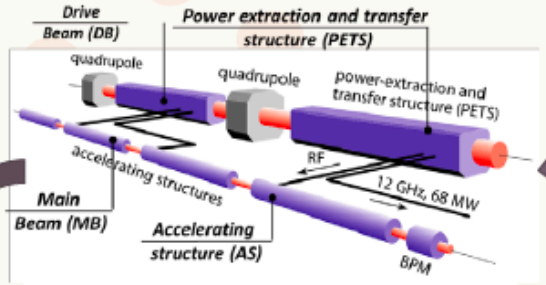


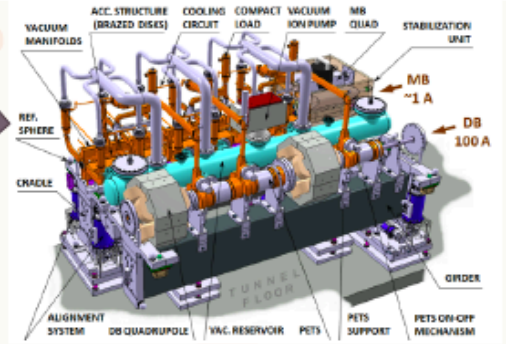


Compact LInear Collider - CLIC

Anastasiya Solodko
Introduction to Accelerator Physics 2016, Budapest

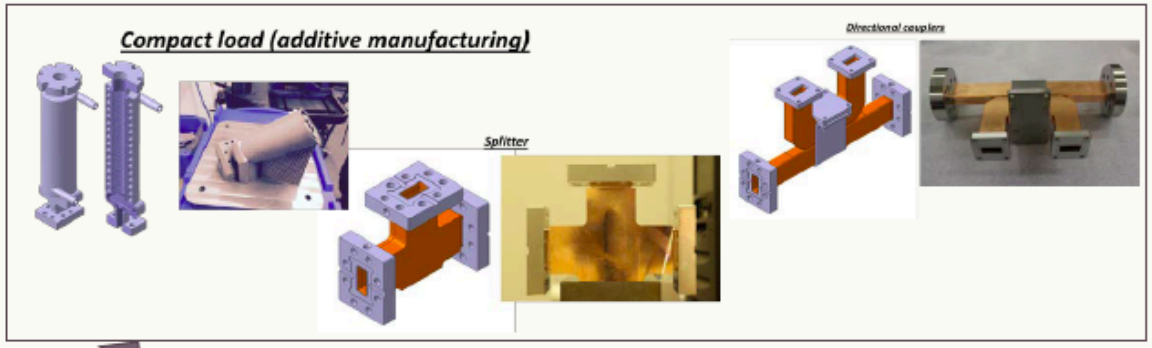


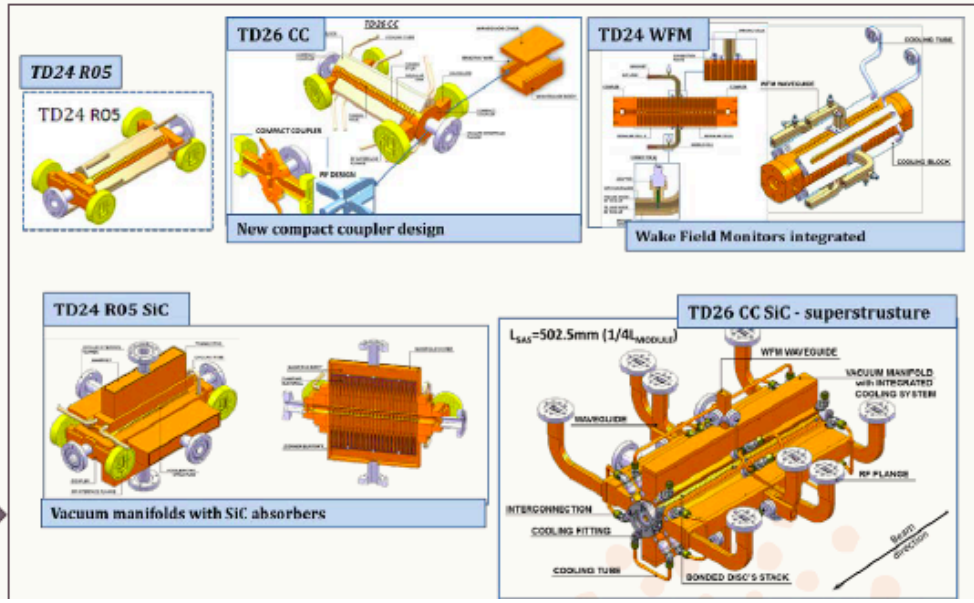




RF components

Accelerating structures

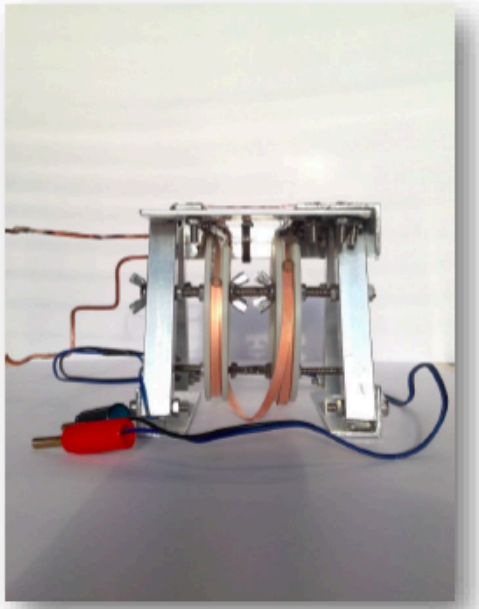


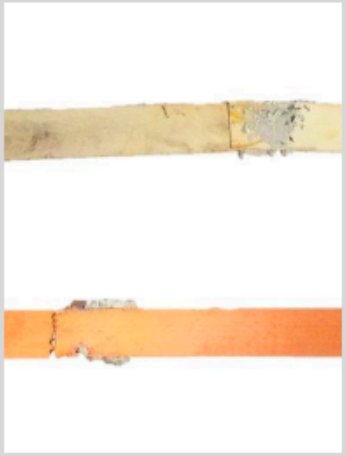


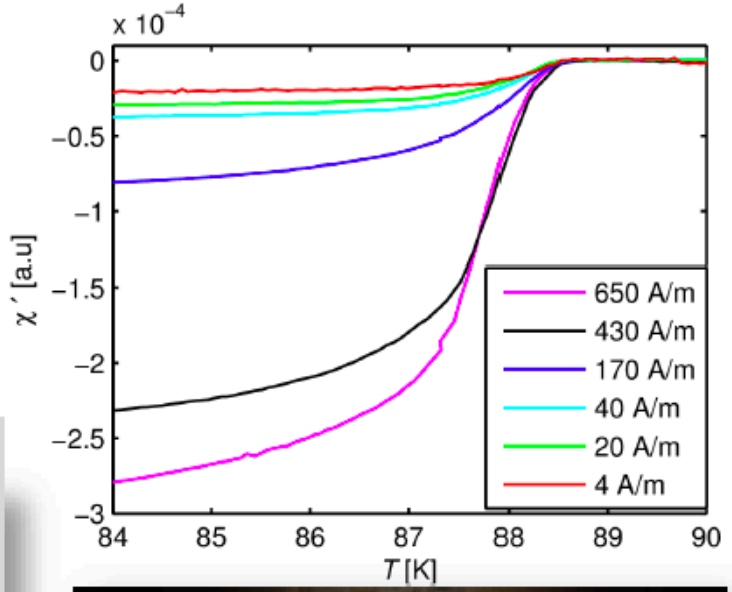
Adrian Szeliga, Poland

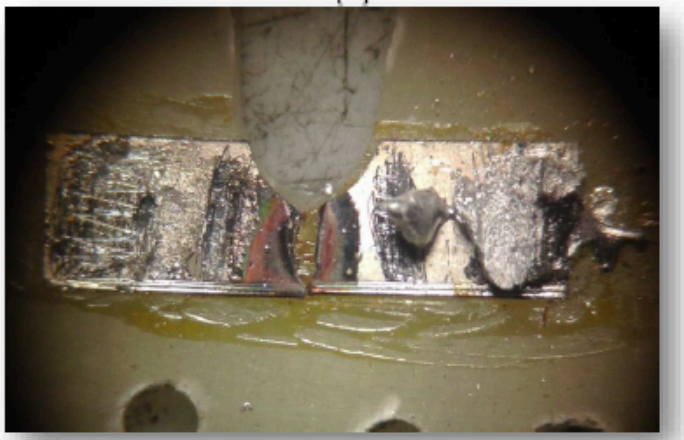
Superconductivity: wires and electro-magnets

AGH









Engineering of leading edge network processors

(Part of Intel's Data Center Group)

IEEE Section Officer, IEEE Standards Member

Consumer electronics, USB*, IEEE1394, storage, Apple SOC's

Design team member of 1st 32-bit CMOS uP (1980)

Skiing, Hockey, Grandparent, science/environment

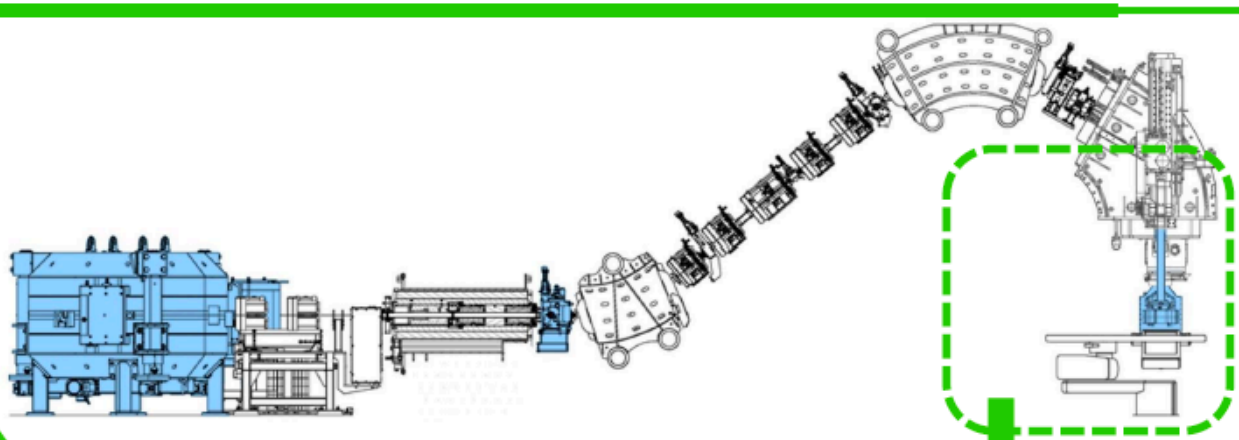
Erik van der Kraaij, from IBA in Belgium

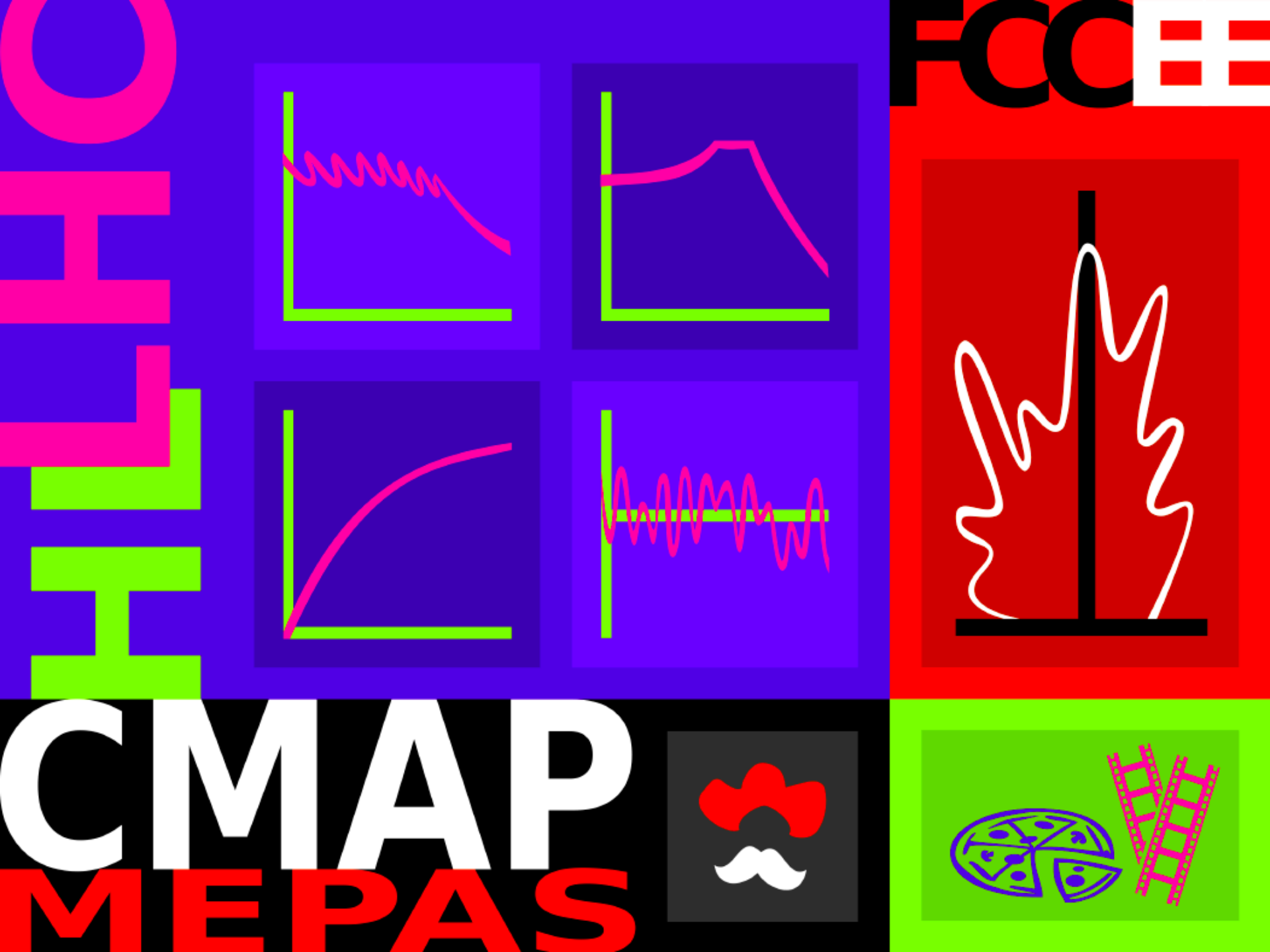
Background in detector physics:

- PhD on ATLAS at CERN
- Fellow on Linear Collider Detectors

At IBA Proton Therapy:

- Two years in Quality Assurance
- Since july, accelerator physicist



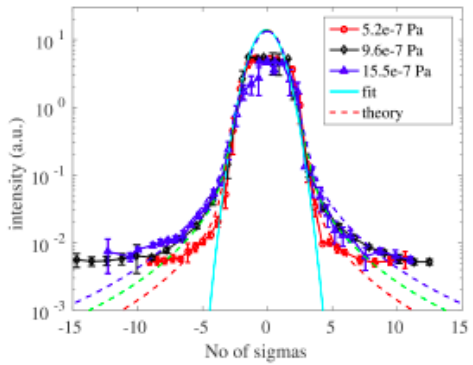

FCC
CMAP
MEPAS

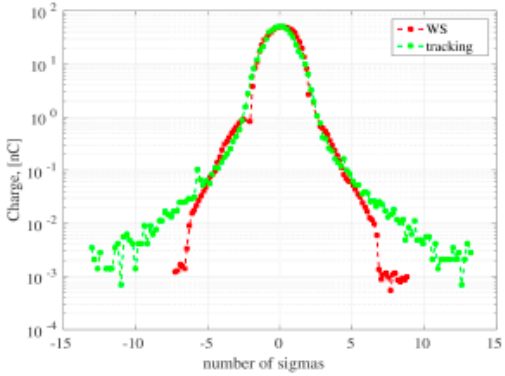
Investigation of beam tail/halo at Accelerator Test Facility of KEK*

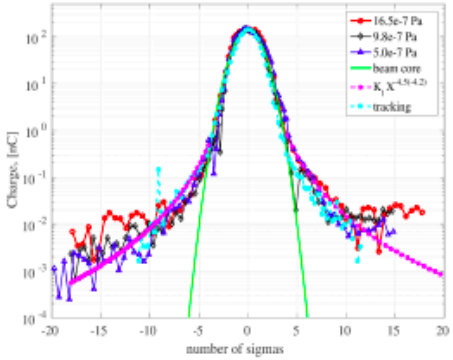
Beam tail/halo is known as a major cause of beam loss and radioactivation in collider, also induces background for high precision particle experiment.
However, the mechanism of halo formation in storage ring (DR) isn't well known.

Here we show that

1) Transverse beam tail/halo at different locations along ATF2 visualized by YAG, WS and DS
2) Vertical beam halo is mainly caused by elastic beam gas scattering DR indicated by analysis estimation, simulation (SAD) and measurement
3) Horizontal beam profile measured in 2016 is higher than the prediction by elastic scattering theory with 2 order of magnitudes;







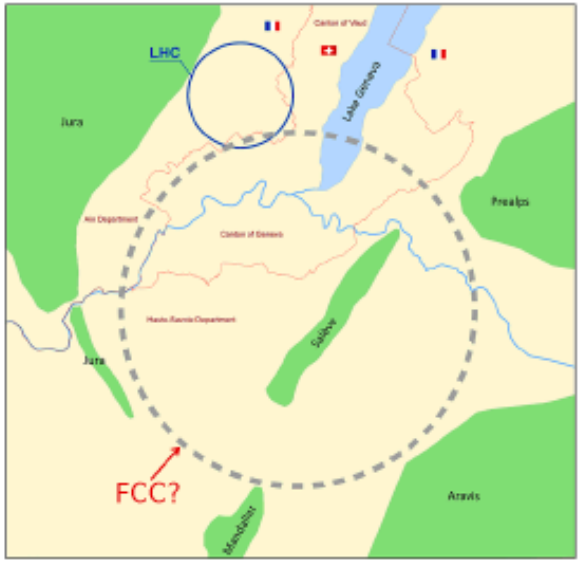
Conclusion:
- Vertical beam halo in DR is mainly caused by elastic beam gas scattering
- Horizontal beam halo could be a result of elastic beam gas scattering and IBS
- Monitor of beam profile with different storage time and beam loss in DR is proposed

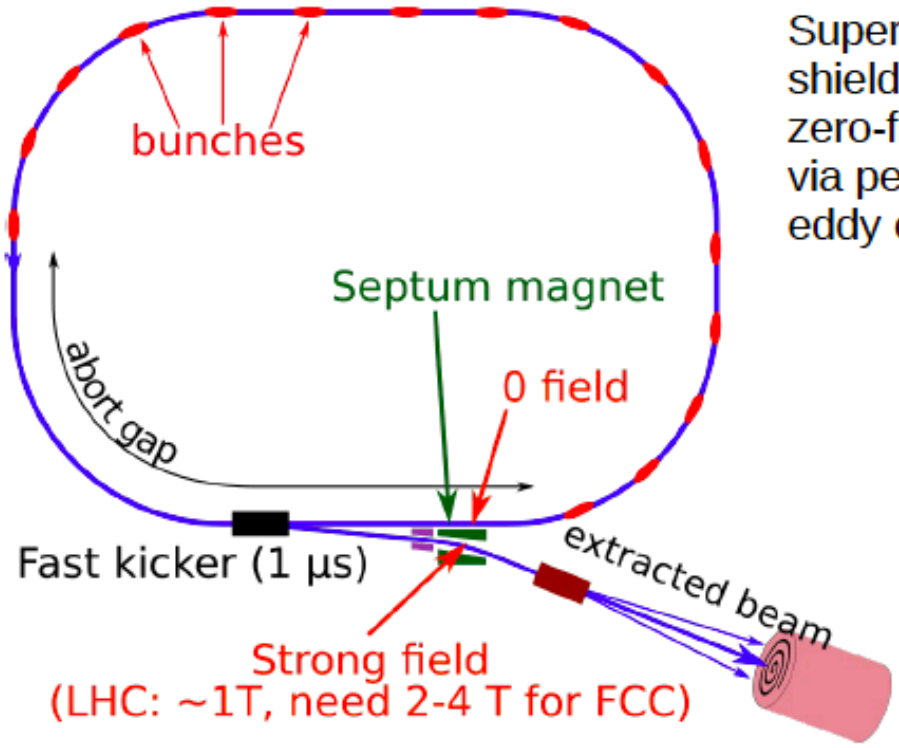
* **Renjun Yang** (Laboratoire de l'Accelerateur Lineaire (LAL), Orsay, France)

The SuShi (**Su**perconducting **Shi**eld) Septum for the FCC

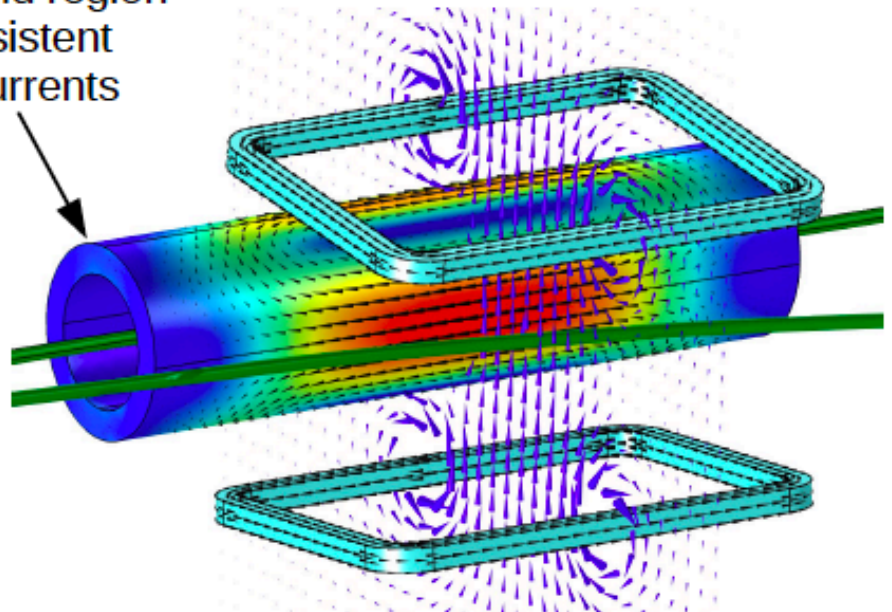
(Dániel Barna, Budapest)

Future Circular Collider	
Circumference	80-100 km
Beam energy	3.3-50 GeV
Stored beam energy	8.4 GJ (24 TGV trains at 150 km/h)



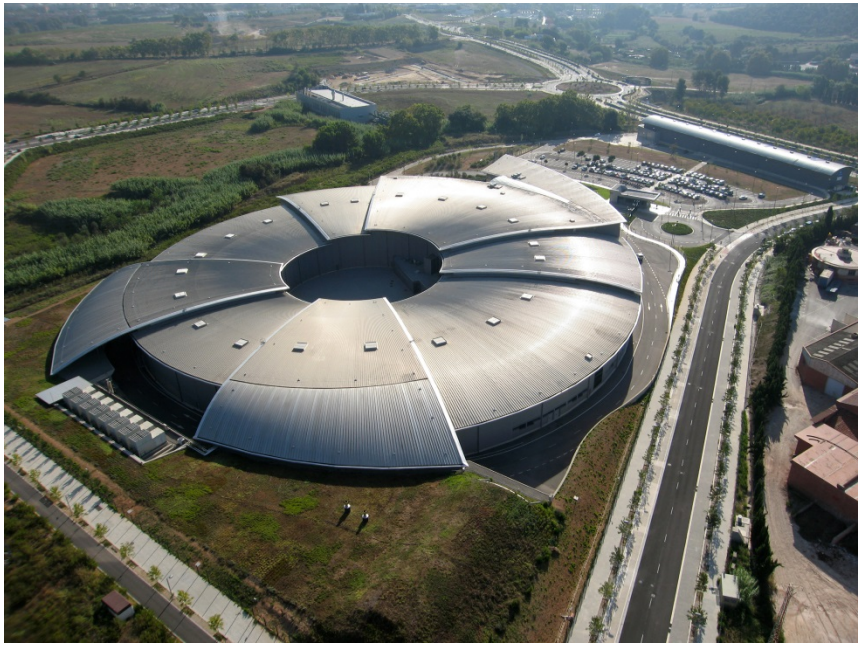


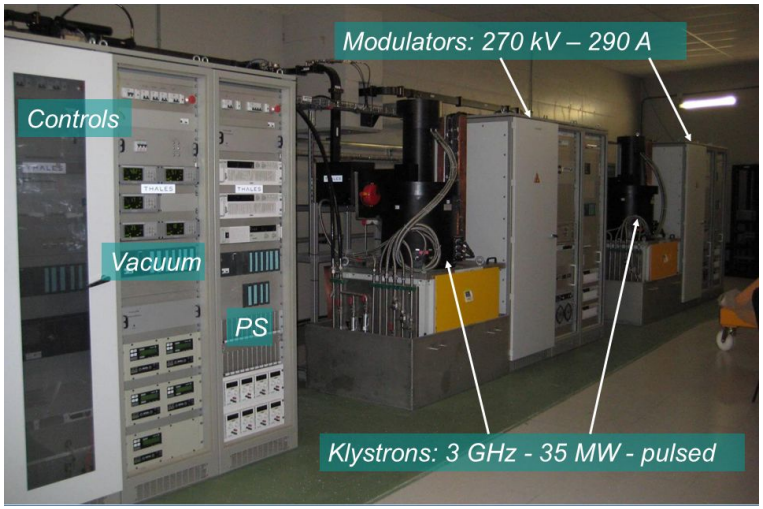
Superconducting shield creates zero-field region via persistent eddy currents



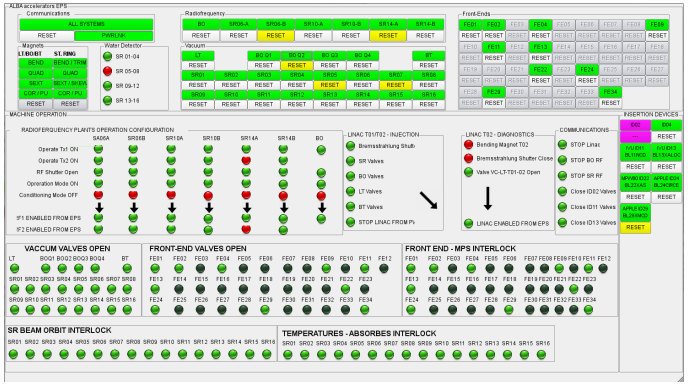
1 Slide 1 Minute

- Electronics Technician.
- ALBA light source operator since Apr'14





-LINAC & Equipment Protection System support & Technician



Marc Sos. CERN Accelerator School, Budapest. Oct'16

apostolos.sounas@cern.ch

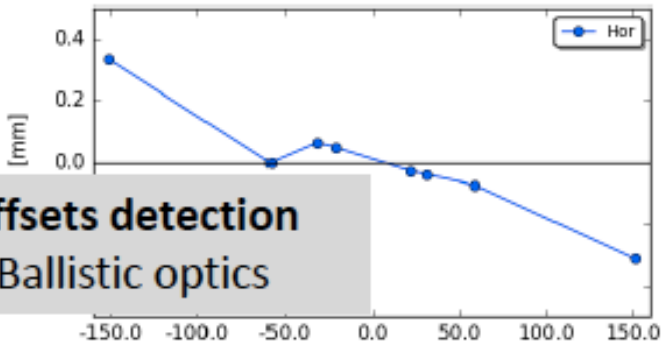
Apostolos Sounas

CERN, BE-BI-QP

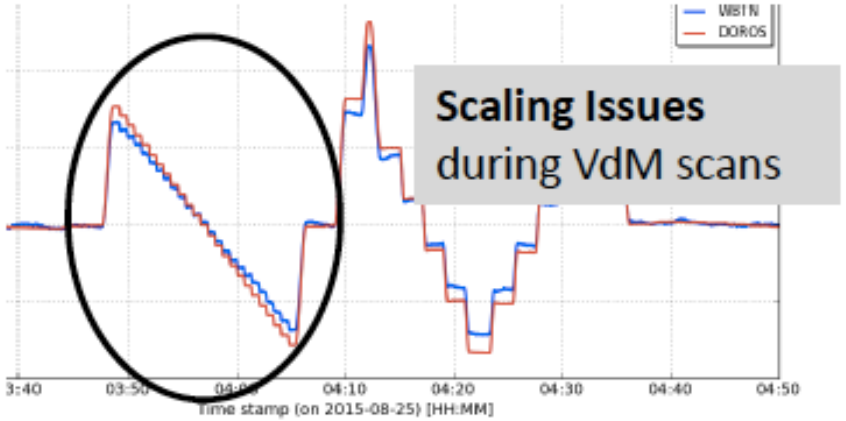
- 2004- 2009 **Diploma in Electrical & Computer Engineering**
  AUTH, Thessaloniki Greece
- 2010- 2015 **PhD in Electrical Engineering**
  EPFL, Lausanne Switzerland
  Research field: *Computational analysis of Multipactor Discharge*
- Sept. 2015 **COFUND Fellow at CERN**

Performance Evaluation of LHC BPM System

- Offline data analysis
- Failure detection



BPM offsets detection
during Ballistic optics



Scaling Issues
during VdM scans

- **Patrick ALEXANDRE, 27, from France.**
- **70 % water, 20% bones, 10 % beer, 5 % brain…**
- **Work at the synchrotron SOLEIL near Paris**
  - ***Pulsed magnet and pulsed power supplies team leader.***
  - ***2 engineers and 3 technicians***

- **Maintain the performances of injection and extraction of electrons at SOLEIL & develop new pulsed magnets for SOLEIL and other machines !**

- Design : pulsed magnetic design, HV pulsed electronics, UHV design, mechanics, control and timing system, alignment, accelerator physics…

SOLEIL	SOLEIL & MAX-IV	THOMX
Upgrade of storage ring injection straight section & active correction of injection bump project	**Design and manufacture of Multipole Injection Kicker for transparent injection**	**Design and manufacture of eddy current in vacuum septum & ultra fast dipole kickers**

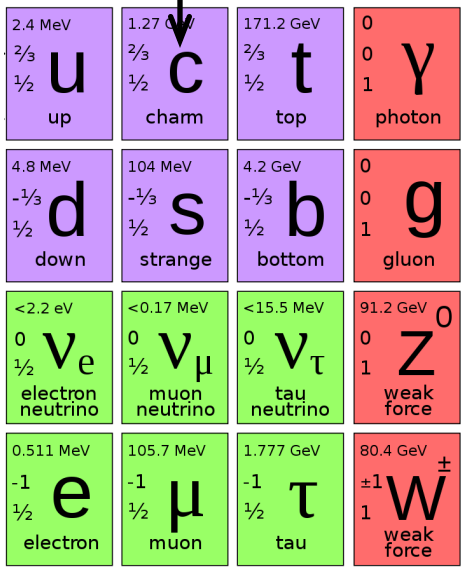
Work and Fun

Roger Bailey, Head of CAS

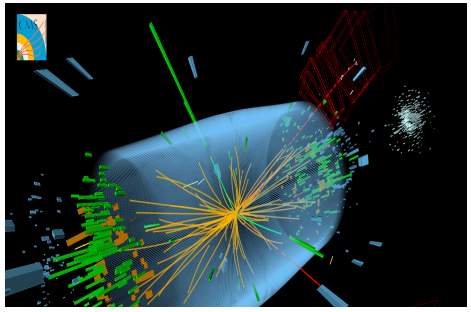
Just for Fun

28 years in Accelerator Operations (shifts, coordination, group leader)

6 years as PhD / Postdoc



06 years on SPS
12 years on LEP



10 years on LHC

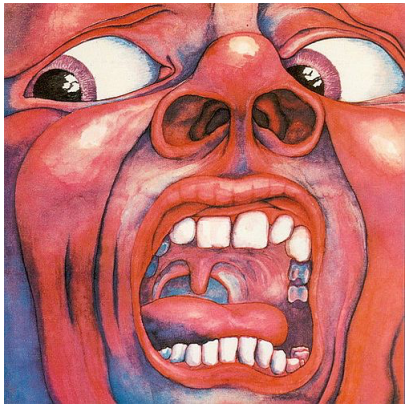
6 years as head of CAS

Played competitive football for 25 years

Downhill ski (off piste whenever possible) and ski randonee for almost 40 years (so far)

Enjoyed live contemporary progressive rock music for almost 50 years (so far)

- King Crimson (1969)
- Pink Floyd (1972)
- Van Morrison (1980)
- Oasis (1994)
- David Bowie (2002)
- Radiohead (2003)
- King Crimson (2016)



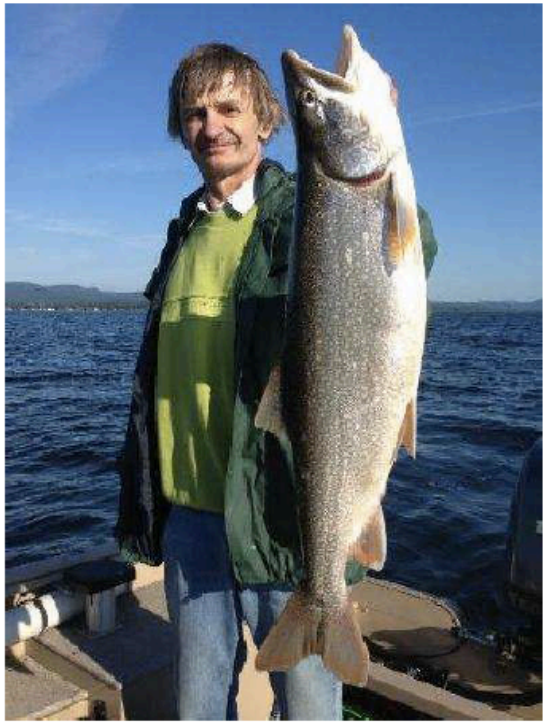
Werner Herr

Studied Physics at University Heidelberg, PhD in particle physics

Arrived at CERN 1978
Since 1986 Accelerator physics (SPS,LEP,LHC)

Teaching at CAS since 2001
Deputy head of CAS since 2011

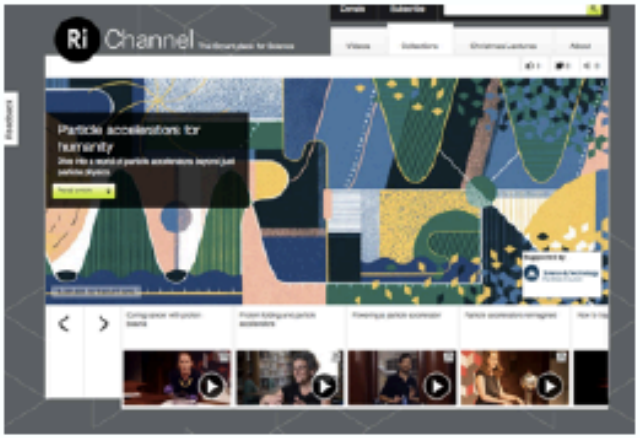
- Main activities:
  - x Non-Linear Dynamics
  - x Multi-particle effects
  - x Beam-Beam effects
  - x Sports and outdoor →
    (Badminton, Yoga, ...)

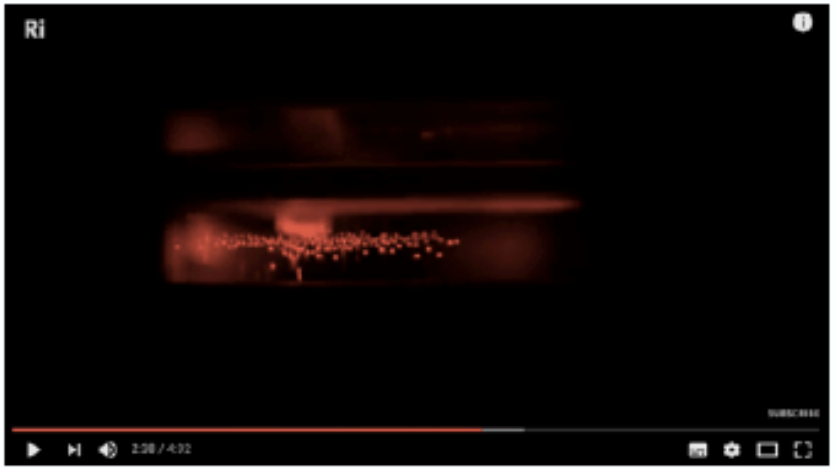


Particle Accelerators for Humanity

http://richannel.org/collections/2016/particle-accelerators-for-humanity

+ on YouTube



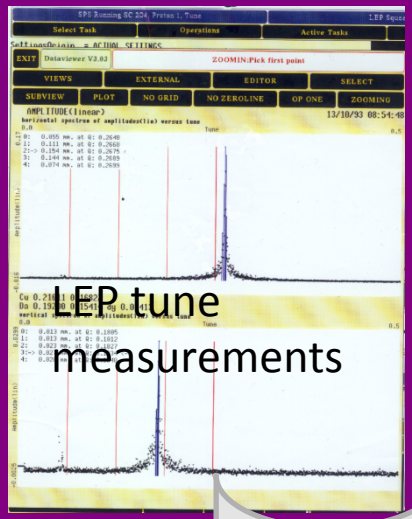


The Royal Institution
Science Lives Here

Science & Technology
Facilities Council

Oxford Physics

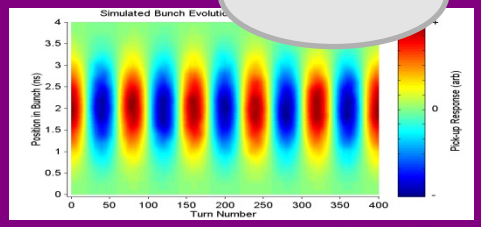
All is in the delicate balance of life



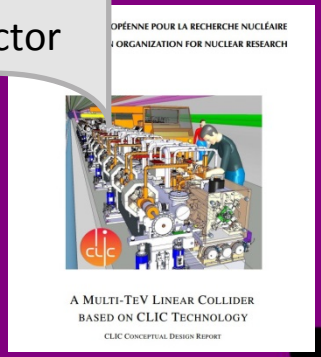
LEP tune measurements

LHC-HiLumi Project

Hermann Schmickler
59 years old
Former head of CERN beam instrumentation and controls
CLIC technical director



Chromaticity Measurement using head-tail motion



CLIC-CDR

Live Sound

HiFi