



Brazilian Synchrotron
Light Laboratory



CNPq
Brazilian Center for Research
in Energy and Materials

JACOW

Team Meeting 2019 Santos

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Light Laboratory



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Why am I here ?



12th International Particle Accelerator Conference

Foz do Iguaçu - Brazil

May 23 - 28th, 2021



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Light Laboratory



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in Energy and Materials

Why are we here, in Santos ?



12th International Particle Accelerator Conference

Santos – Brazil
May 2021

The secret reasons !



Tapioca Dices with pepper sauce

@ Bistrô Calixto

The secret reasons !



Tapioca Dices with pe
@ Bistrô Calixt

Argentinian Beef
@ Puerto de Palos

The secret reasons !



Tapioca Dices with potato
@ Bistrô Calixto



Argentinian Beef
@ Puerto de Foz



Canole
@ Piccolo Café

The secret reasons !



Tapioca Dices with potato and cheese
@ Bistrô Calixto



Argentinian Beef
@ Puerto de Buenos Aires



Piccolo Café
@ Piccolo Café



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Light Laboratory



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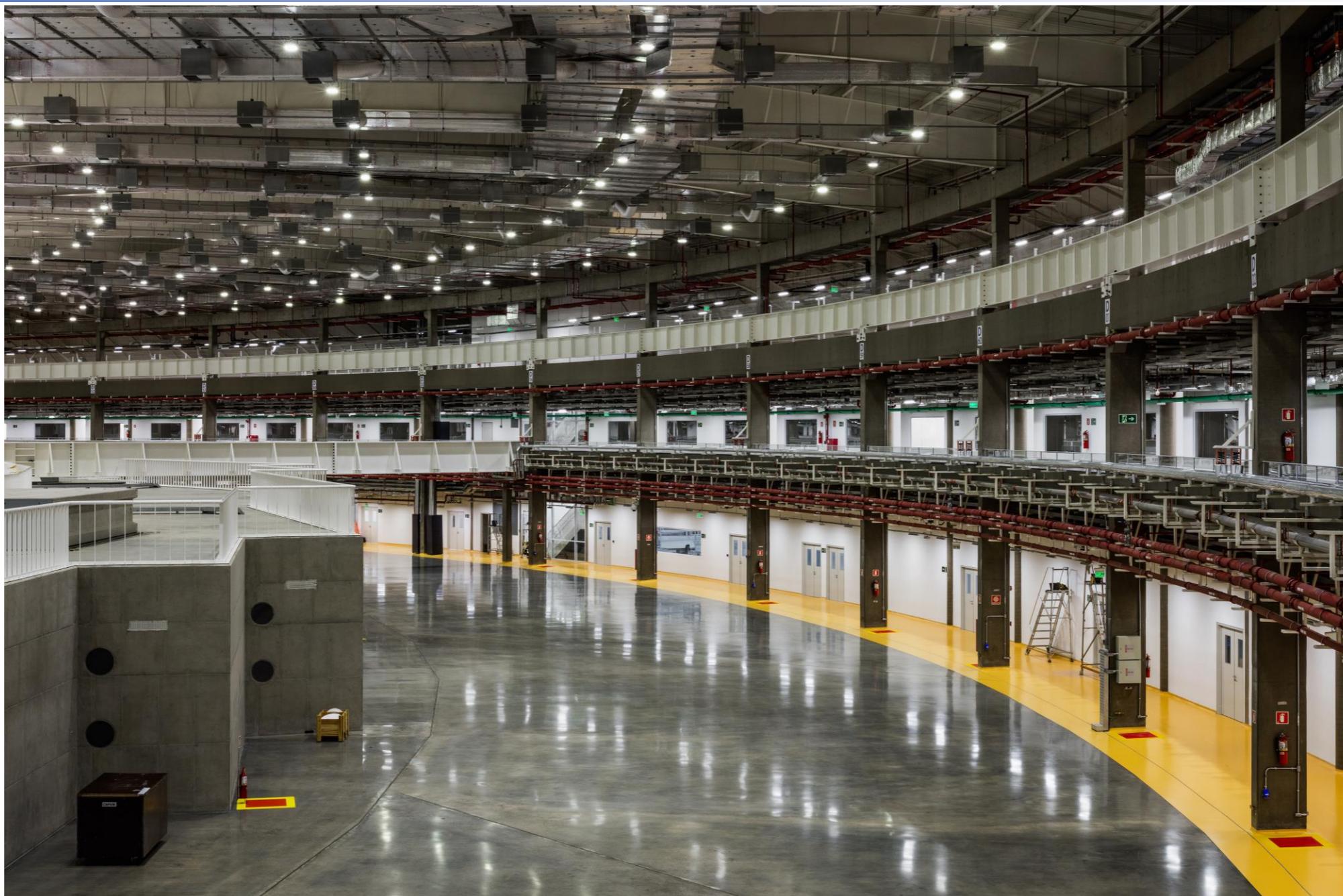
Let's be Sirius now !



Recent pictures



Recent pictures



Recent pictures



Recent pictures



Recent pictures

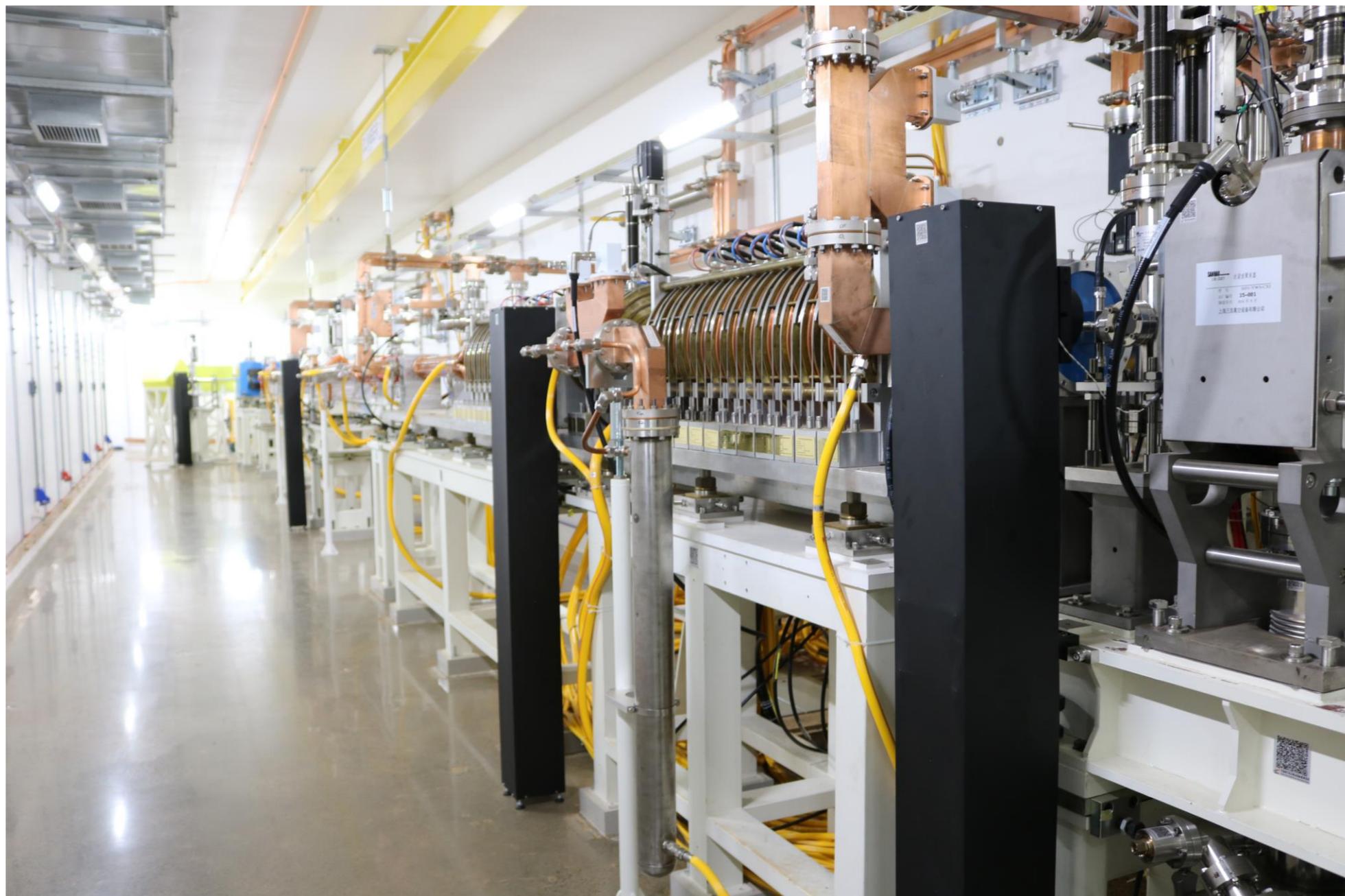


Recent pictures



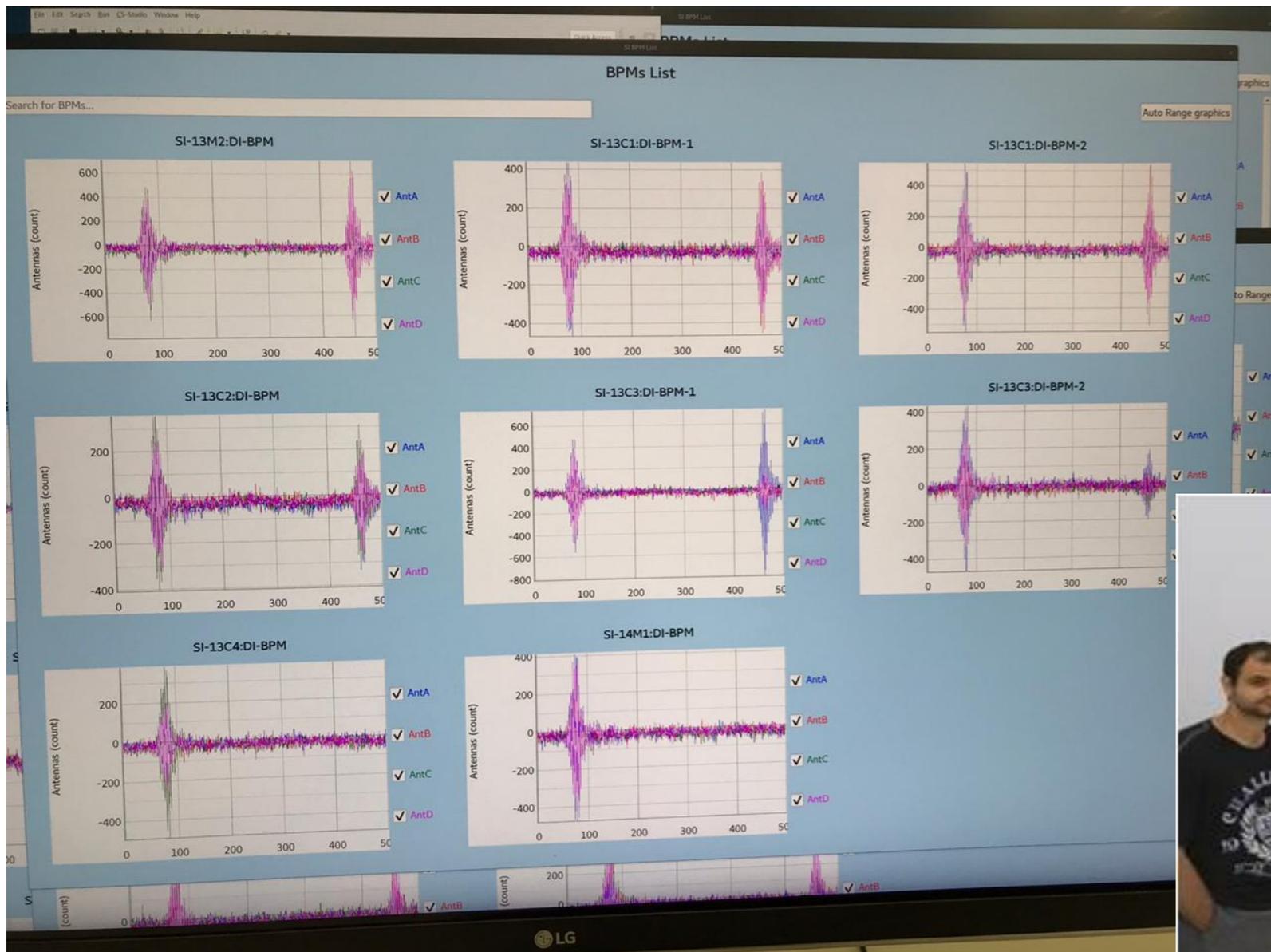
MANACÁ Beamline

Recent pictures



Recent pictures

First electron loop around Sirius's
storage ring,
November 22nd.





Brazilian Center for Research in Energy and Materials

Campinas Downtown



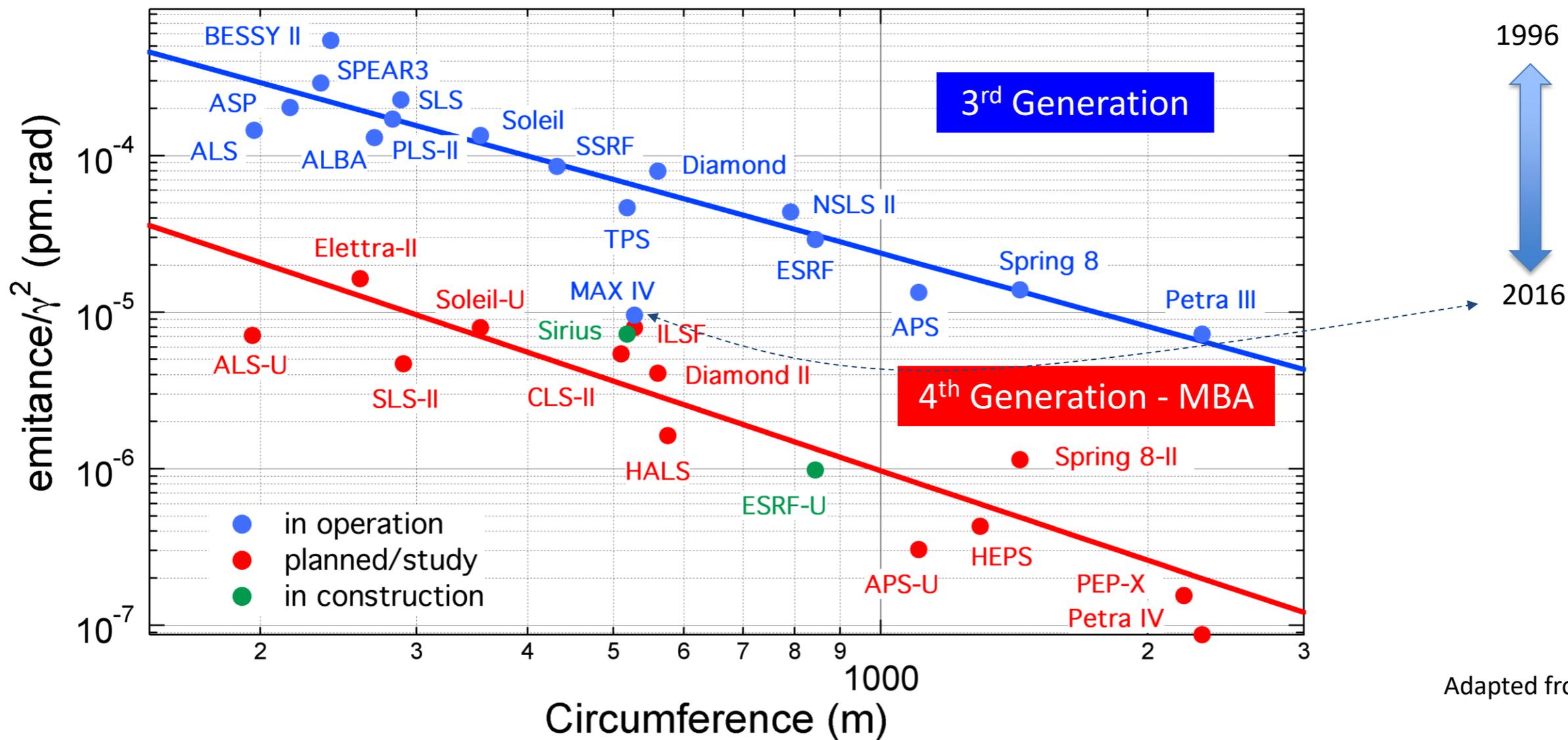
Sirius

Parameters and subsystems

IPAC

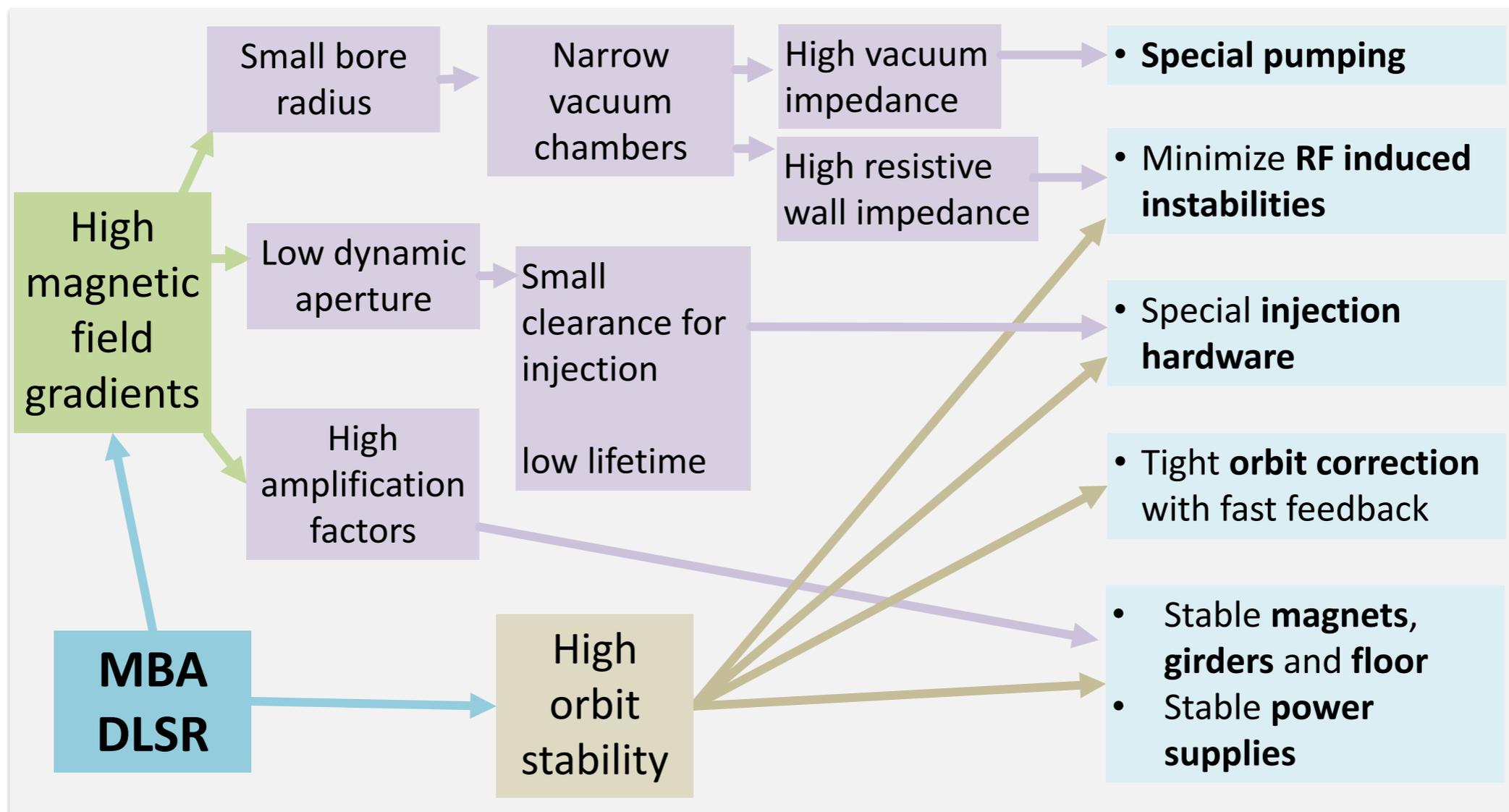
Design of a Diffraction Limited Light Source (DIFL)

D. Einfeld, J. Schaper, Fachhochschule Ostfriesland, Constantiaplatz 4, D-26723 Emden
M. Plesko, Institute Jozef Stefan, Jamova 39, P.O.B. 100, SLO-61111 Ljubljana



Adapted from R. Bartollini

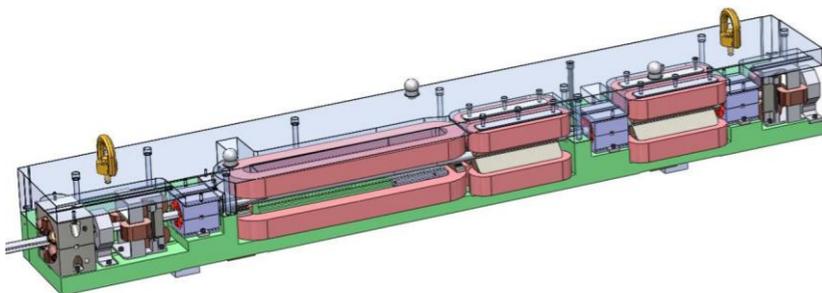
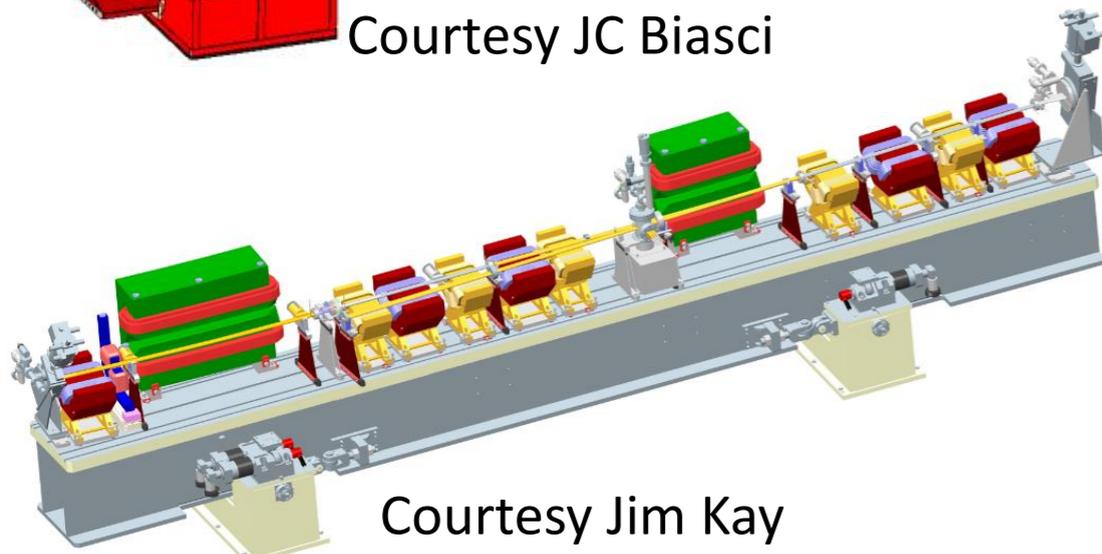
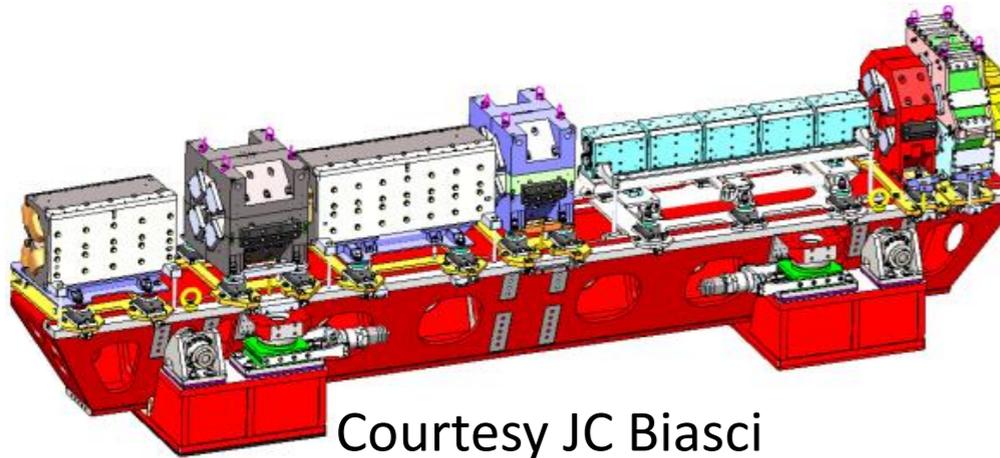
Multiple Bend Achromat chain reaction diagram





Créditos:
Racional
Engenharia

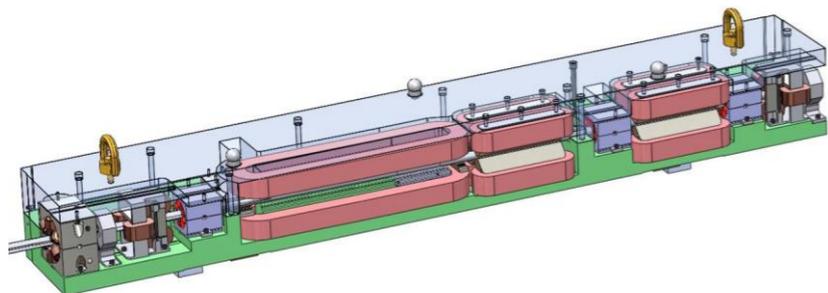
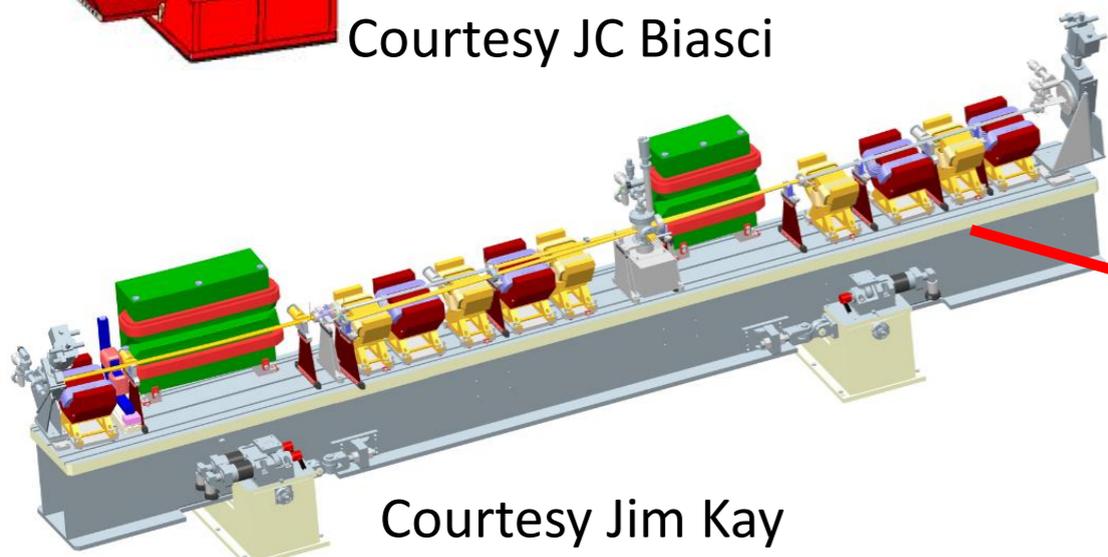
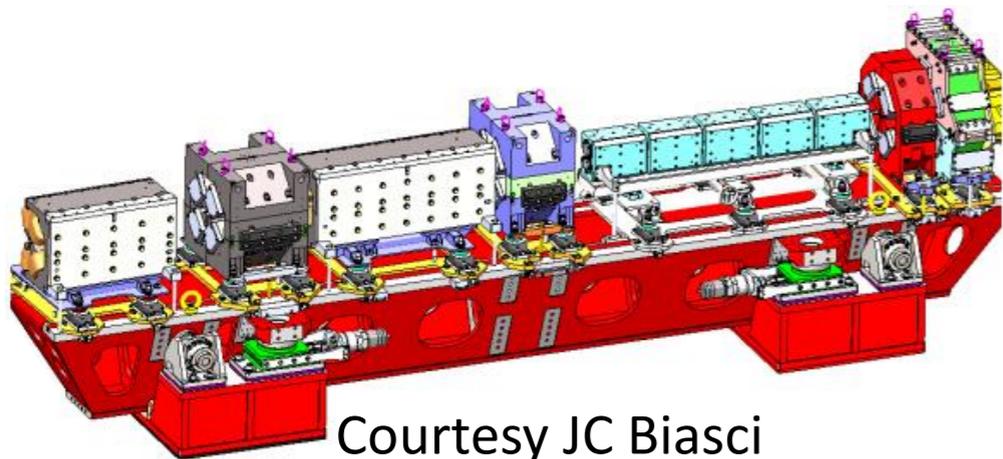
High stability girder



Overview on magnet-girder assembly

Light Source	description	f_1 (Hz)	$TF_{s2M\&G}$
ESRF	3 motorized jacks, remote alignment, manual horizontal adjustment, insufficient stiffness	10 (7)	1.3 (2.2)
Spring-8	6 support points, stiff alignment mechanism	19	1.9
APS	4 Wedge Jacks	9.5 (10.5)	1.5 (9)
Petra III	Similar to Diamond: Girder pedestals, 5 cam systems, beam based girder alignment		
SLS	Girder pedestals, 5 cam systems, beam based girder alignment	15.5	
Soleil	4-points support when operation, 3 Airloc jacks when alignment	46	1.0
Diamond	Girder pedestals, 5 cam systems, remote alignment	16.3	4.6
SSRF	3 support points, Wedge Jacks and ball bearing, + 3 assistant supports	23	1.3
Alba	Fixed, 6- point support + vertical fixation	28	
NLS II	8-points support, fixed, manual alignment	30	1.4
TPS (proto)	6 cam systems + locking systems	30	

High stability girder



Overview on magnet-girder assembly

Light Source	description	f_1 (Hz)	$TF_{s2M\&G}$
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Petra III	Similar to Diamond: Girder pedestals, 5 cam systems, beam based girder alignment		
SLS	Girder pedestals, 5 cam systems, beam based girder alignment	15.5	
Soleil	4-points support when operation, 3 Airloc jacks when alignment	40	1.0
Diamond	Girder pedestals, 5 cam systems, remote alignment	16.3	4.6
SSRF	3 support points, Wedge Jacks and ball bearing, + 3 assistant supports	25	1.3
Alba	Fixed, 6- point support + vertical fixation	28	
NLS II	8-points support, fixed, manual alignment	30	1.4
TPS (proto)	6 cam systems + locking systems	30	

High stability girder

Overview on magnet-girder assembly

Light Source	description	f_1 (Hz)	$TF_{S2M\&G}$
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APS	4 Wedge Jacks	9.5 (10.5)	1.5 (9)
Petra III	Similar to Diamond: Girder pedestals, 5 cam systems beam based girder alignment	116	
SLS	Girder pedestals, 5 cam systems, beam based girder alignment	15.5	
Soleil	4-points support when operation, 3 Airloc jacks when alignment	46	1.0
Diamond	Girder pedestals, 5 cam systems, remote alignment	16.3	4.6
SSRF	3 support points, Wedge Jacks and ball bearing, + 3 assistant supports	25	1.3
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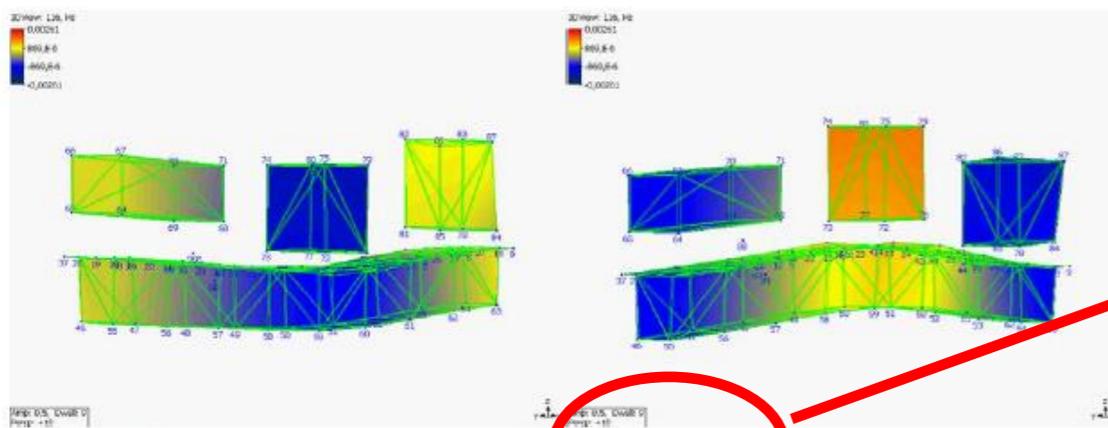


Figure 7: First vertical modal shape of girder at 116 Hz, girder on concrete stands

Courtesy Markus Schloesser

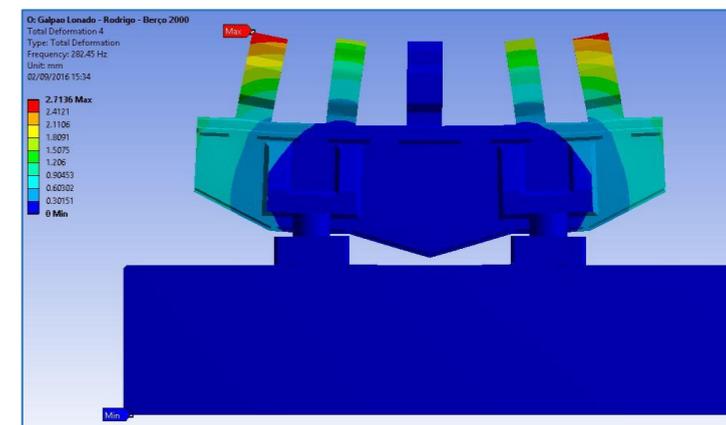
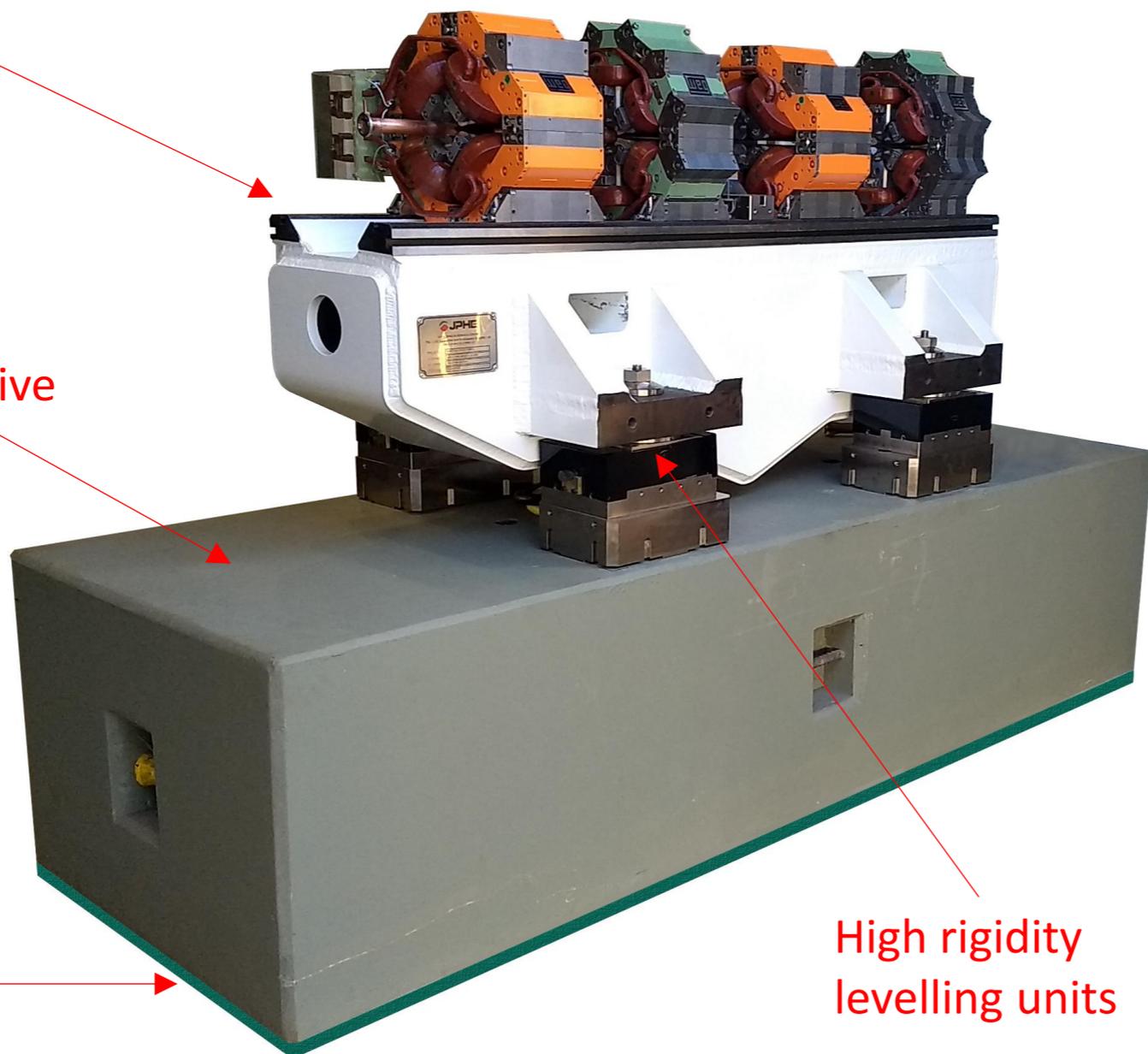
Courtesy L. Zhang – Workshop on Accelerator R&D for USR

High stability girder

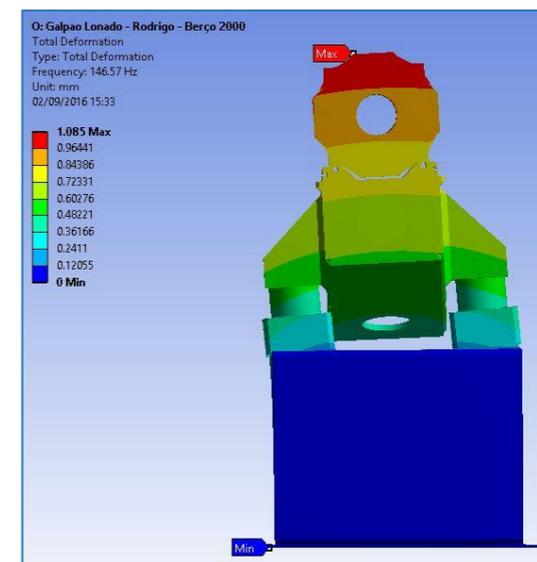
10 micrometer flatness girder

100 MPa compressive strength concrete

5 GPa compressive strength resin



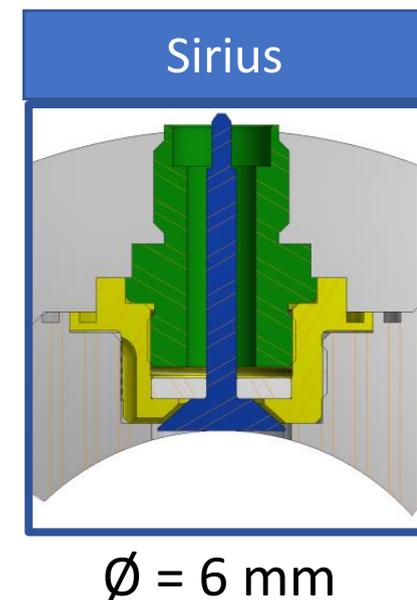
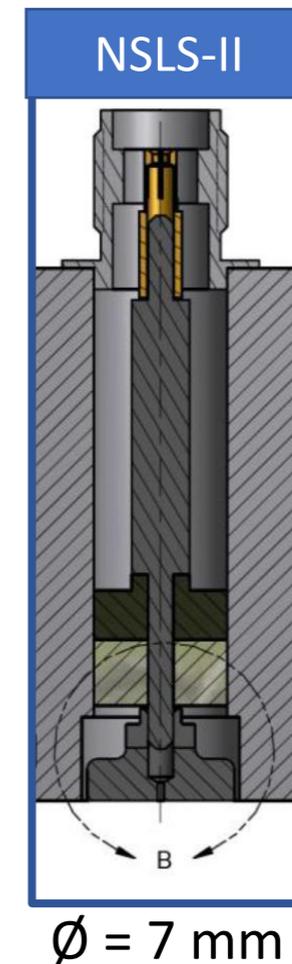
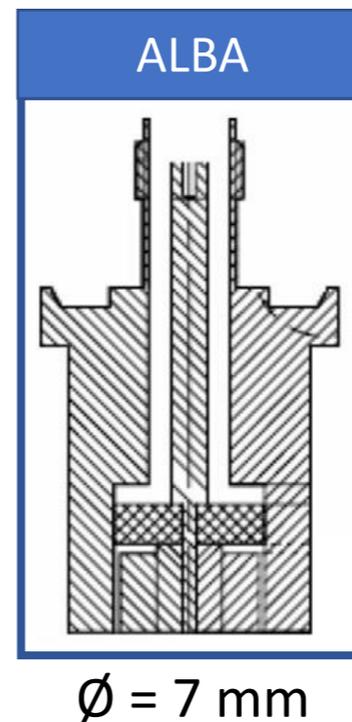
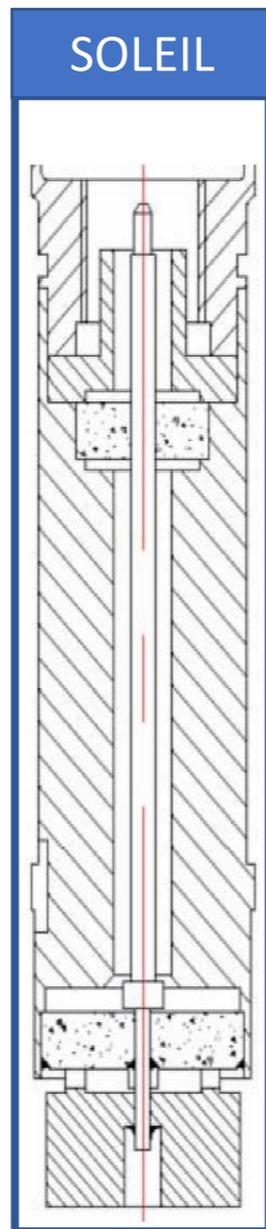
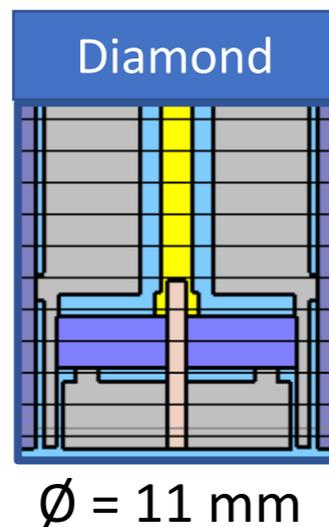
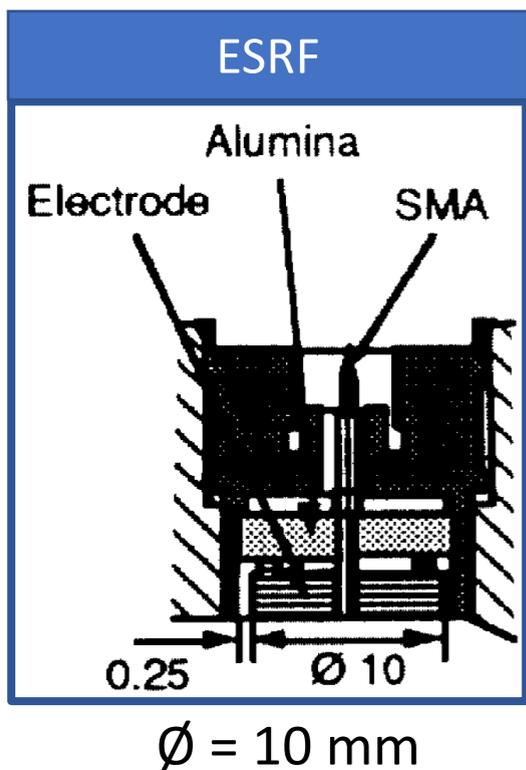
V 1st mode: 268 Hz



H 1st mode: 152 Hz

High rigidity levelling units

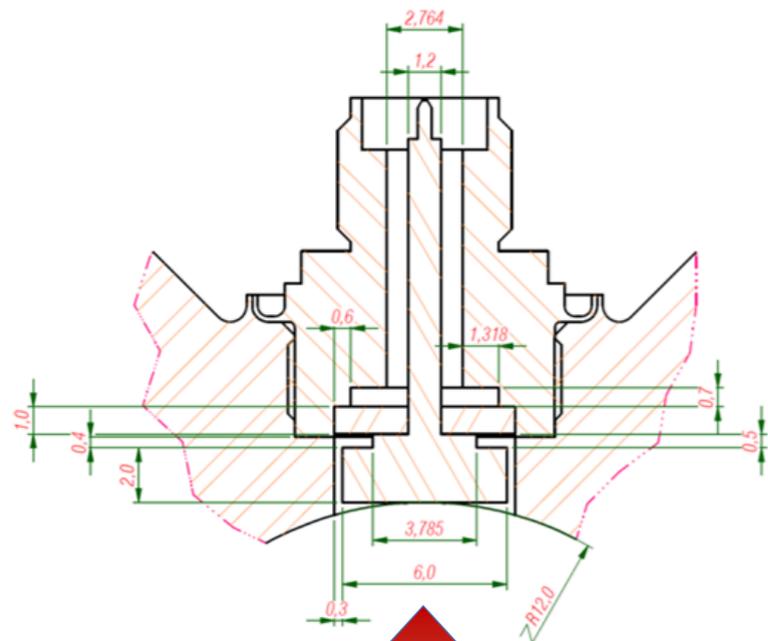
BPM buttons



Same relative scale

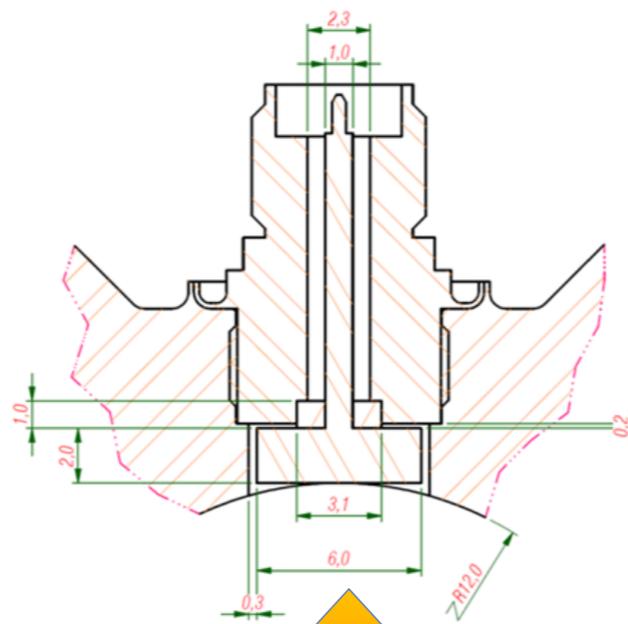
BPM buttons

Step-Shaped BPM Button



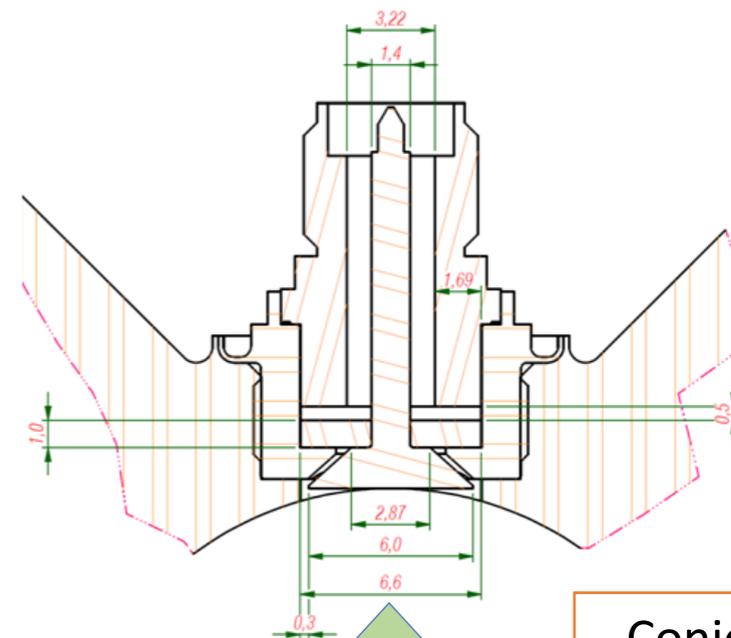
Input
power

Flat BPM Button



37%
reduction

Bell-Shaped BPM Button



50%
reduction

Conical profile
shifts the HOMs
to higher
frequencies.

wakelosses calculated from electromagnetic (wakefield) simulations based on Alun Morgan and Guenther Rehm work and help

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ABDW	DIPAC	HB	IPAC	PCaPAC
APAC	ECRIS	HIAT	LINAC	RuPAC
BIW	EPAC	IBIC	MEDSI	SAP
COOL	ERL	ICALEPCS	NA-PAC	SRF
CYCLOTRONS	FEL	ICAP	PAC	

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CYCLOTRONS	FEL	ICAP	PAC	

Great job !

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COOL	ERL	ICALEPCS	NA-PAC	SRF
CYCLOTRONS	FEL	ICAP	PAC	

Great job !

Many thanks !



Welcome to Brazil,
welcome to Santos
... and a very productive week !