ELENA KICKERS AND SEPTA

ELENA Meeting, 28.09.2011

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TE/ABT

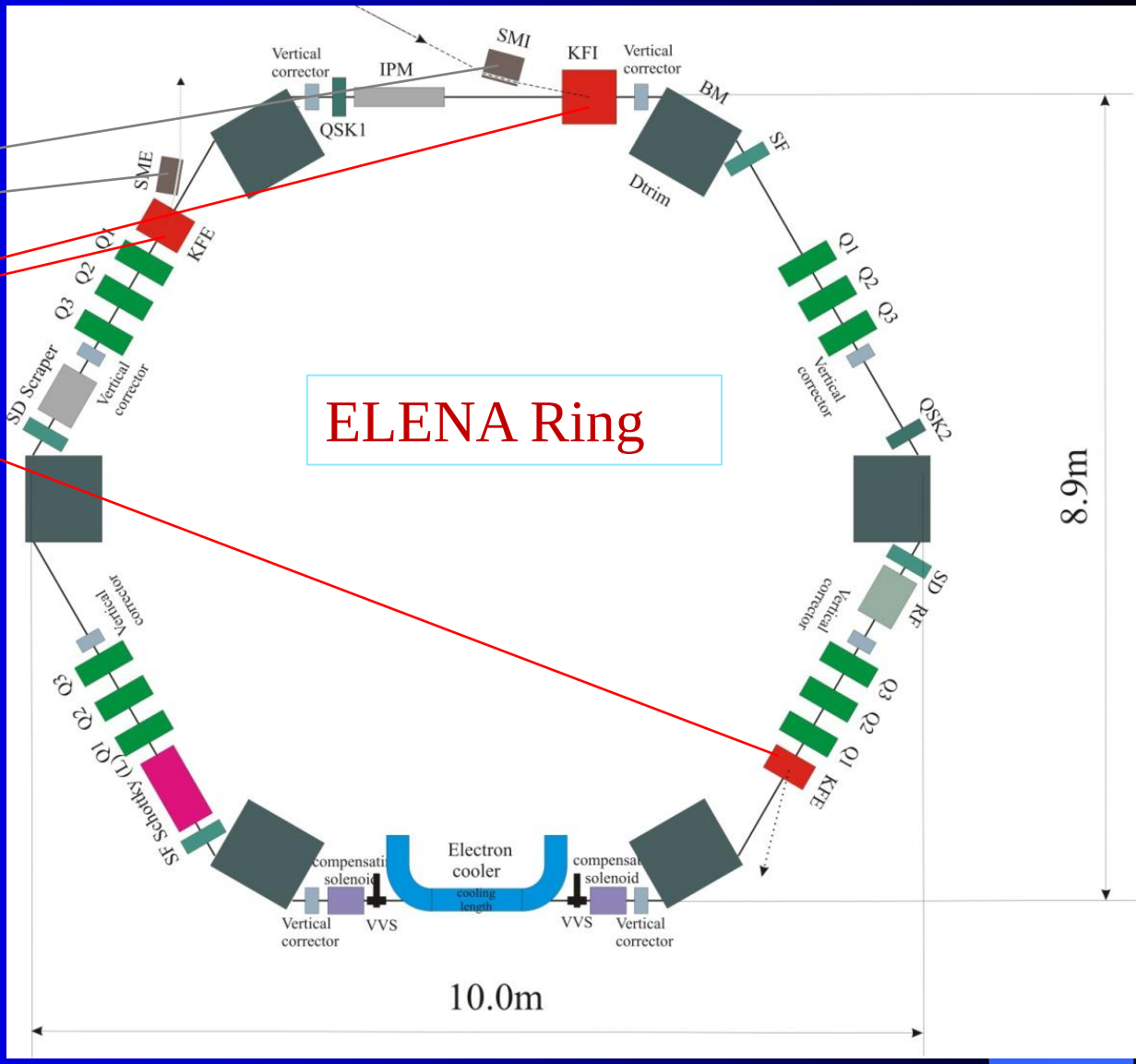
Contents

- Introduction: TE/ABT equipment
- Septa
- Kickers

TE/ABT equipment

ELENA (new)
- 2 septa
- 2 (+1 foreseen) kickers

AD (existing)
- 8 kicker systems
- 2 septa



Septa

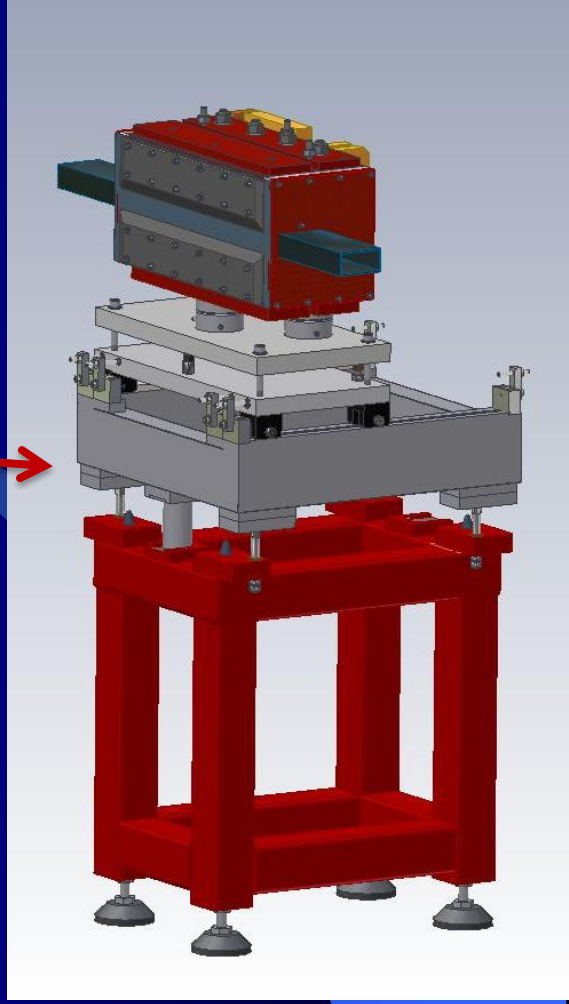
What's already available?

SM12		
# magnets	2	
# spare coils	0	
Gap width	134	mm
Gap height	74	mm
Septum thickness	22.8	mm
$L_{physical}$	400	mm
L_{eq}	300	mm
B_0	679	mT
$\int B.dl_{max}$	204	mT.m
I_{max} (DC)	2000	A

Septa

What's needed?

- Mechanical support
- Water cooling manifold gauges, flow meters, filters and valves
- Magnet protection interlock system



What's needed, but not included?

- Vacuum chambers (TE/VSC?)
- Power supplies (TE/EPC?)

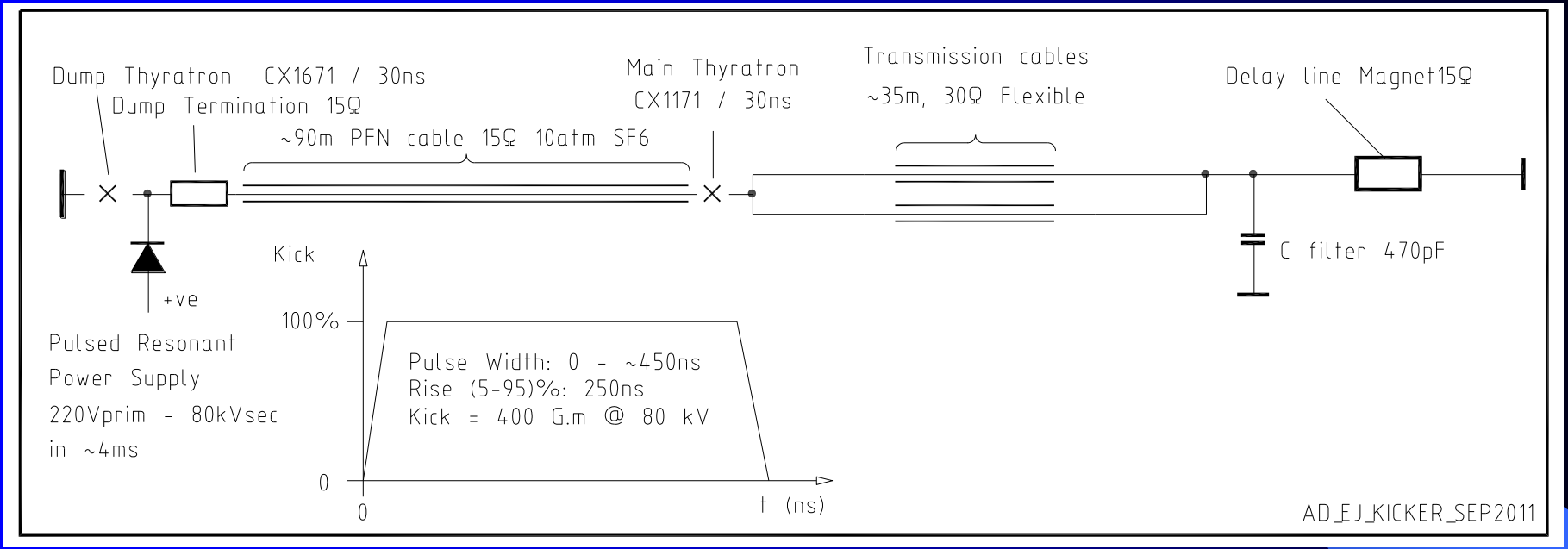
Septa

Resource requirements and what can collaborations contribute to?

Magnetic septa	Total resource needs	
Mechanics, hydraulics	45	kCHF
Interlock system, PLC's	30	kCHF
Total for both magnetic septa	**75**	**kCHF**

Manpower estimate	CERN ABT staff	Collaboration contribution	Total resource estimate	
Scientific staff	0.1		0.1	m.y
Technicians	0.1	0.2	0.3	m.y
Controls technician	0.1	0.2	0.3	m.y
Mechanics	0	0.3	0.3	m.y
Total manpower	**0.3**	**0.7**	**1.0**	**m.y**

Kickers



ELENA and AD kicker system layout

Features:
- SF_6 Gas filled Pulse Forming Line
- PFL voltage up to 80 kV
- Thyratron switches
- use of oil for cooling and insulation

10 systems: 2 for ELENA and 8 for AD (+space for 2 new spares for future needs like second Elena extraction line)

Kicker generators relocation

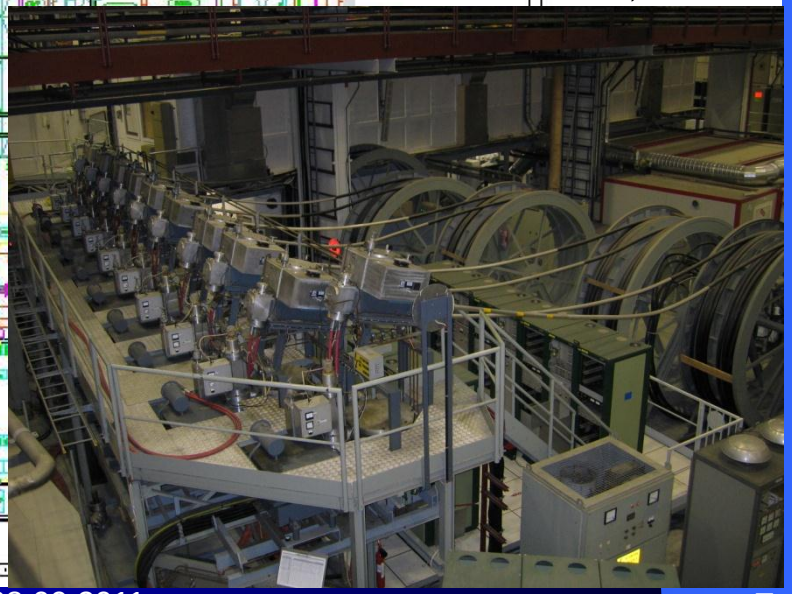
Option 2 most preferred but technically difficult and exposed to radiations

Option 3 second most preferred to be studied

Option 4 least preferred (above racks)

Option 1 least preferred (space needed for future experiences)

Present kicker platform (10 generators)

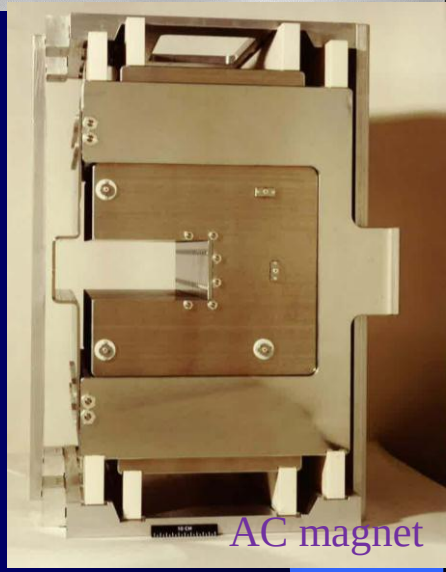


Kicker magnets and tanks

Basic assumption: use of existing unused AC ejection or AA injection magnet modules (to be confirmed by P. Belochitskii)

- 3D models of magnets to be made with Catia software.
- Two new magnet frames made of stainless steel to be manufactured for 300 °C bake-out.(ex AC magnets only)
- Magnets to be dismounted and reassembled with new frame. (ex AC magnets only)
- Two (identical ?) 300 °C bake-able vacuum tanks and ancillaries to be designed, manufactured, equipped and tested.


AA magnet


AC magnet

Kicker magnets and tanks

Resource requirements and what can collaborations contribute to?

ELENA kickers (*)	Total resource estimate	
Magnet modifications	40	kCHF
Vacuum tanks and ancillaries	276	kCHF
HV and LV cables	24	kCHF
Thyratrons	80	kCHF
HV generator upgrade	100	kCHF
Fluids	50	kCHF
Total for 2 kickers	**570**	**kCHF**

Manpower estimate (*)	CERN ABT staff	Collaboration contribution	Total resource estimate	
Scientific staff	0.5		0.5	m.y
Technical assistant	0.5		0.5	m.y
Technician	1		1	m.y
(Electro)Mechanic	0.5		0.5	m.y
Draughtsman		0.5	0.5	m.y
Total manpower	**2.5**	**0.5**	**3**	**m.y**

(*) without controls

Kicker platform displacement

Resource requirements and what can collaborations contribute to?
(the cost and manpower for a new building are not included)

	Total resource estimate (*)	
Material and general services	**306**	**kCHF**

Manpower estimate (*)	CERN ABT staff	Collaboration contribution	Total resource estimate	
Scientific staff	0.1		0.1	m.y
Technical assistant	0.1		0.1	m.y
Mechanics technician	0.1		0.1	m.y
(Electro)Mechanic	0.3	0.3	0.6	m.y
Electronics technician	0.2		0.2	m.y
FSU	(0.3) ⟶	0.3	0.3	m.y
Total manpower	**0.8**	**0.6**	**1.4**	**m.y**

(*) without controls

Kicker controls

Resource requirements and what can collaborations contribute to?

ELENA kickers	Total resource estimate	
Injection/Extraction	200	kCHF
Fluid systems	40	kCHF
Common controls	60	kCHF
Total for 2 kickers	**300**	**kCHF**

AD kickers displacement/rejuvenation	Total resource estimate	
Power distribution	150	kCHF
Re-cabling	100	kCHF
PXI control	100	kCHF
Common controls	180	kCHF
Total for 8 kickers	**530**	**kCHF**

Manpower estimate	CERN ABT staff	Collaboration staff	Total resource estimate	
Electronics engineer	0.5		0.5	m.y
Electronics technician	2.5	2	4.5	m.y
Total manpower	**3**	2	**5**	**m.y**

Conclusion

TE/ABT related work and resource needs have been presented.

Critical points are still to be clarified:

- final choice of extraction kicker magnet
- new location of the kicker platform

Reference: **CERN-BE-2010-029 OP, November 2010**