

Kicker options for MTE

Prepared by L.Ducimetière, L.Sermeus

Outline:

Reminder : Present MTE dedicated kickers

Hybrid extraction using CT elements

Faster KFA 13 – 21 (shorter rise time)

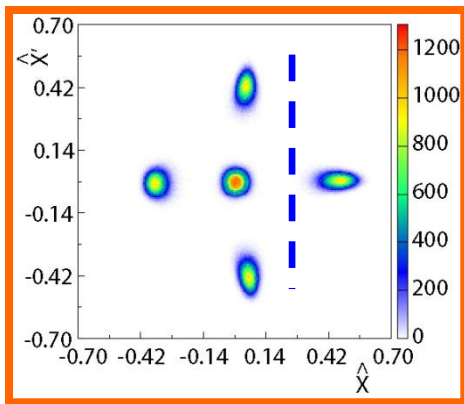
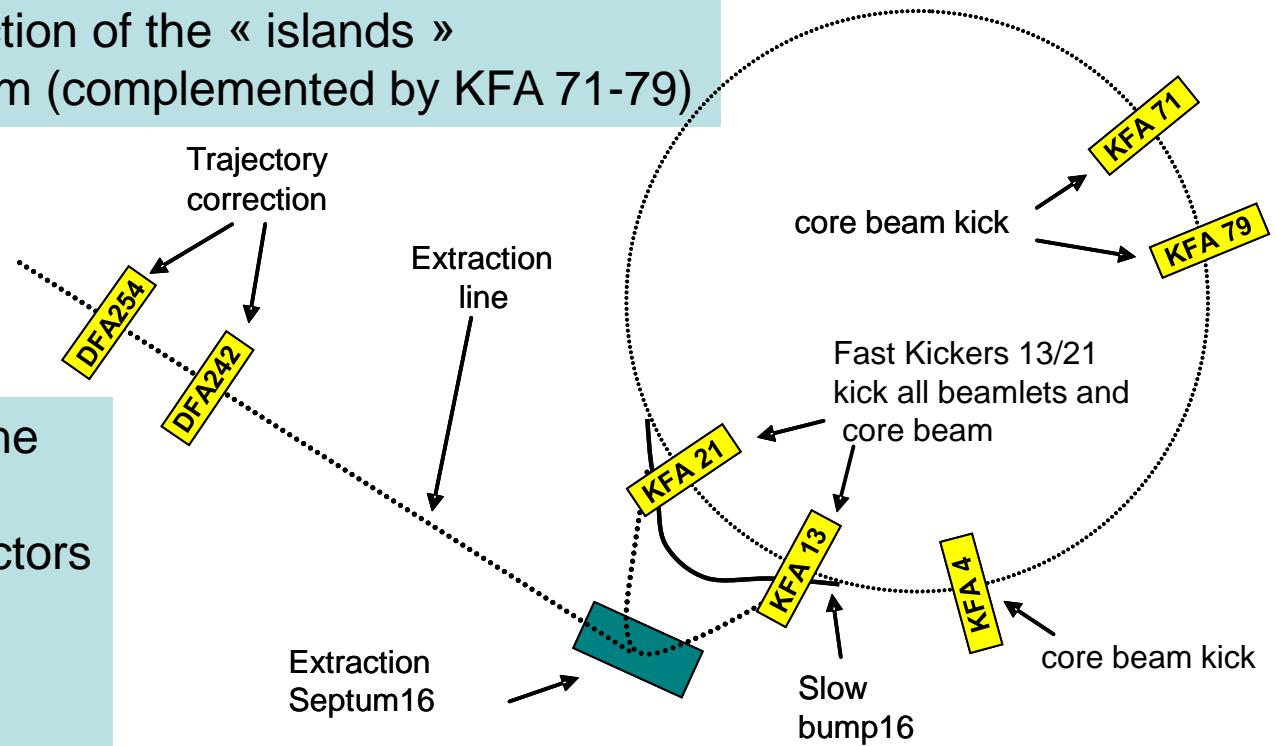
Stronger KFA 13 – 21

«Phase 1» construction completed in 2008:

- KFA 13/21 for the extraction of the « islands »
- +KFA 4 for the core beam (complemented by KFA 71-79)

«Phase 2» pending until the dismantling of the CT:

- 5-stair kick for the correctors DFA 242 and DFA 254
- KFA 9 for perfect bump closure.



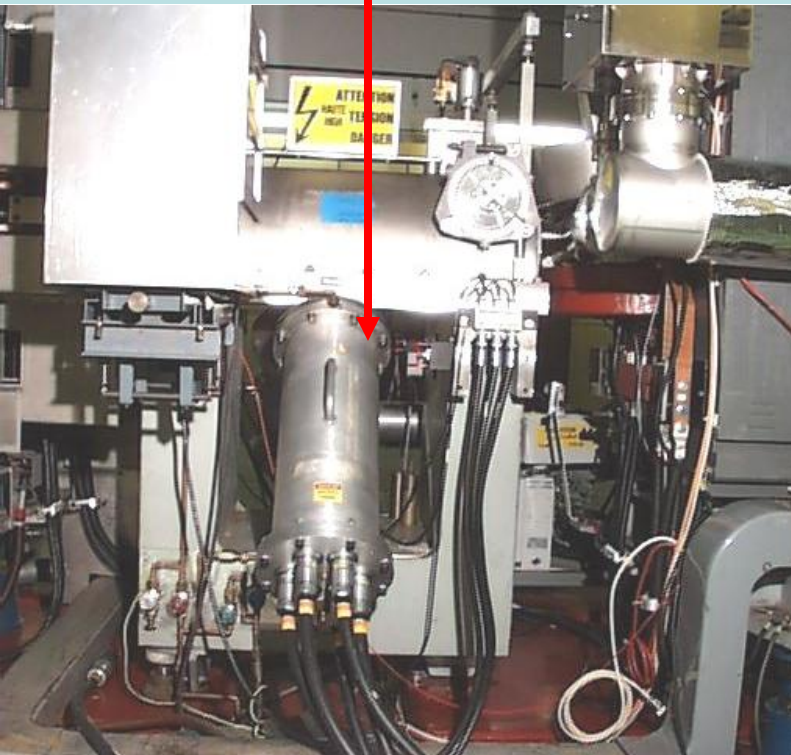
Present situation, CT still in use:

- 5-stair kick for the corrector DFA 254 using old RSG generator
- 1 stair only for DFA 242
- PPM implemented in 2010 for KFA 9

Hybrid extraction using CT elements

For a full compatibility CT + MTE :

- 5-stair kick for the DFA 242 using the refurbished NSG switches
- Refurbishment of RSG switches for the DFA 254 – 10 kCHF, 0.2 MY
- Consolidation of BFA 9 tank feedthrough (new oil-free interface), ring oil system – 10 kCHF, 0.1 MY



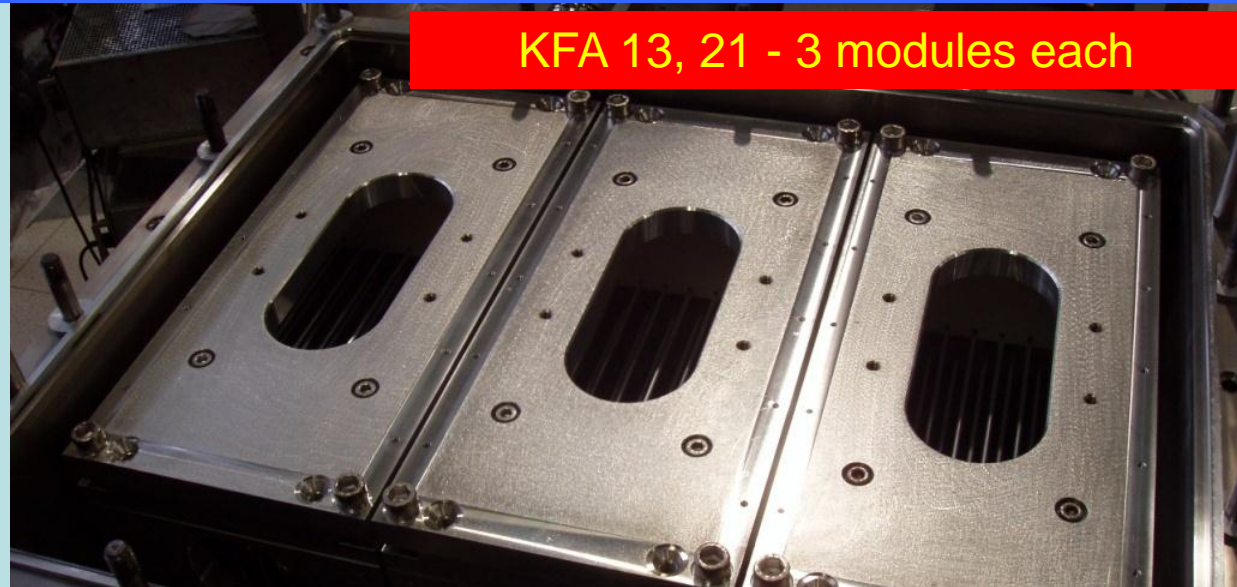
- Update B 359 infrastructure (oil retention, fire hazards; full detail in IEFC days, March 2011)
240 kCHF, 2 MY by end LS1

- Full refurbishment of electrical distribution and Electronics&Controls by end LS1
(see Etienne's talk for details and M+P)

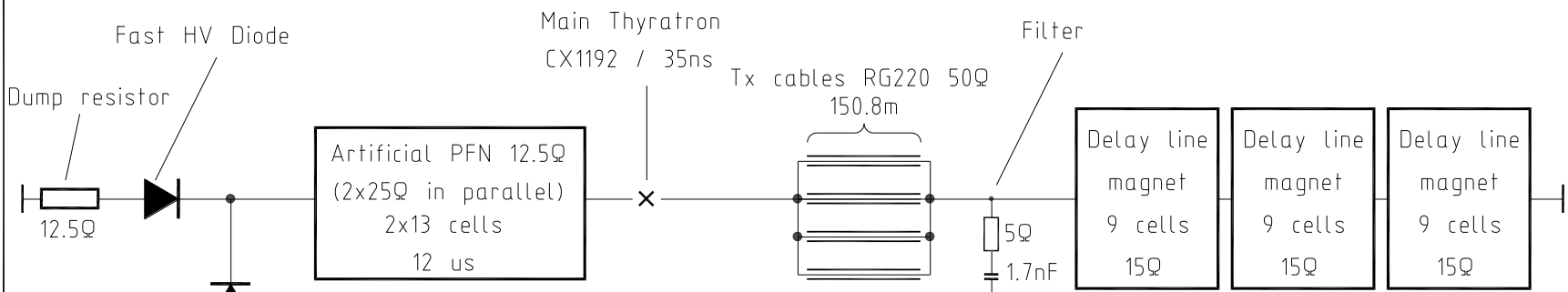
Faster KFA 13 – 21 (shorter rise time)

For both KFA 13 and KFA 21, 1 PFN supplies 3 series-connected magnet modules.

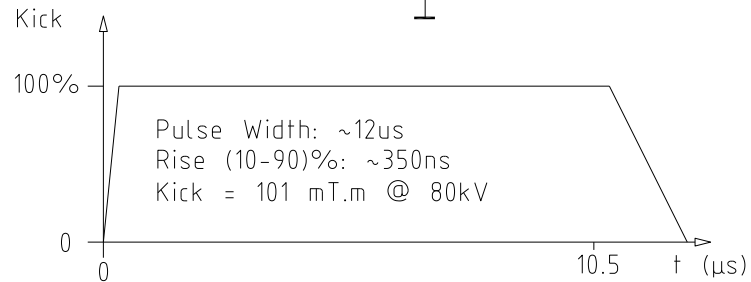
Shorter rise time can be achieved by energising the 3 kicker modules by independent PFN's rather than in series.



KFA 13, 21 - 3 modules each



Pulsed Resonant Power Supply
~550V_{prim}-80kV_{sec} in 5ms



Possible gain on rise time

Series : 327 ns (10-90)%
Indep. : 125 ns

Series : 388 ns (5-95)%
Indep. : 150 ns

Faster KFA 13 – 21 (shorter rise time)

Additional equipment required:

- ▶ 4+1 spare PFNs + 2 vacuum tanks
- ▶ hydraulic systems + cooling
- ▶ electronics and controls
- ▶ new building in PS ring centre



Resource estimate (based on equipment built in 2008):

- | | |
|----------------------|--|
| ▶ Equipment | 6.0 MCHF (2008 prices) |
| ▶ New building | 1.0 MCHF (250 m ² @ 4 kCHF/m ²) |
| ▶ Manpower (staff) | 12 MY (not presently available) |
| ▶ Time to completion | $t_0 + 2.5 Y$ |

in building 367
(same as POPS !!)

Increasing the strength of the KFA13 – 21 have been suggested to give more clearance at septum 16.

However :

- Magnets already operating in short-circuited mode
- No room for additional magnets
- Nominal operating voltage provides no margin: system working with only 6% margin from the design/test voltage (10% recommended)
- Many component already at the limit (cables connectors, HV capacitors, cables)



| Scenario and option | Resources | | Feasibility |
|---------------------|-----------|-----|---|
| | kCHF | MY | |
| CT only | 240 | 2.0 | Update of B 359 infrastructure during LS1 |
| MTE only | 110 | 1.1 | 90% for updating B 359 infrastructure during LS1 |
| CT-MTE Hybrid | 260 | 2.3 | 90% for updating B 359 infrastructure during LS1 |
| Thinner septum | - | - | |
| Dummy Septum | - | - | |
| Faster kicker | 7000 | 12 | Incl. EC; Manpower not available, long lead time, new building, not realistic |
| Stronger kicker | - | - | Not technically feasible |

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Expecting clear roadmap from this workshop

LS1 program needs advance scheduling