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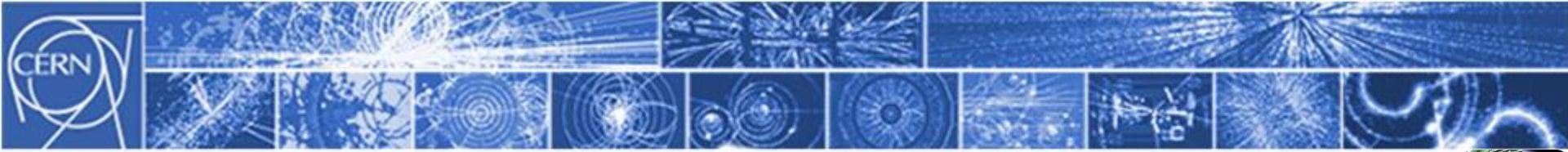


BT2.KFA20 Kicker

Implication of STAGISO beam delivery with maximum intensity (4 rings)

L. Sermeus

GUI 6 February 2017



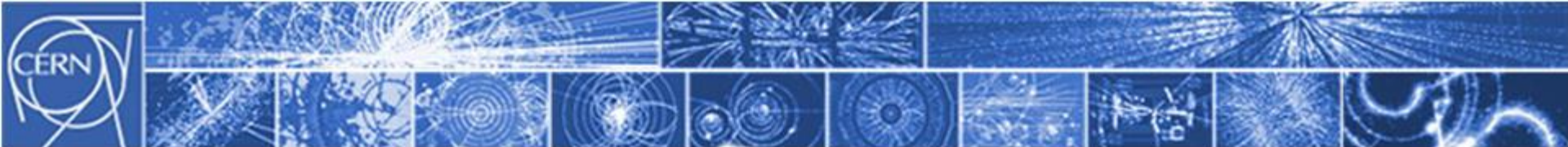
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BT2.KFA20 for STAGISO



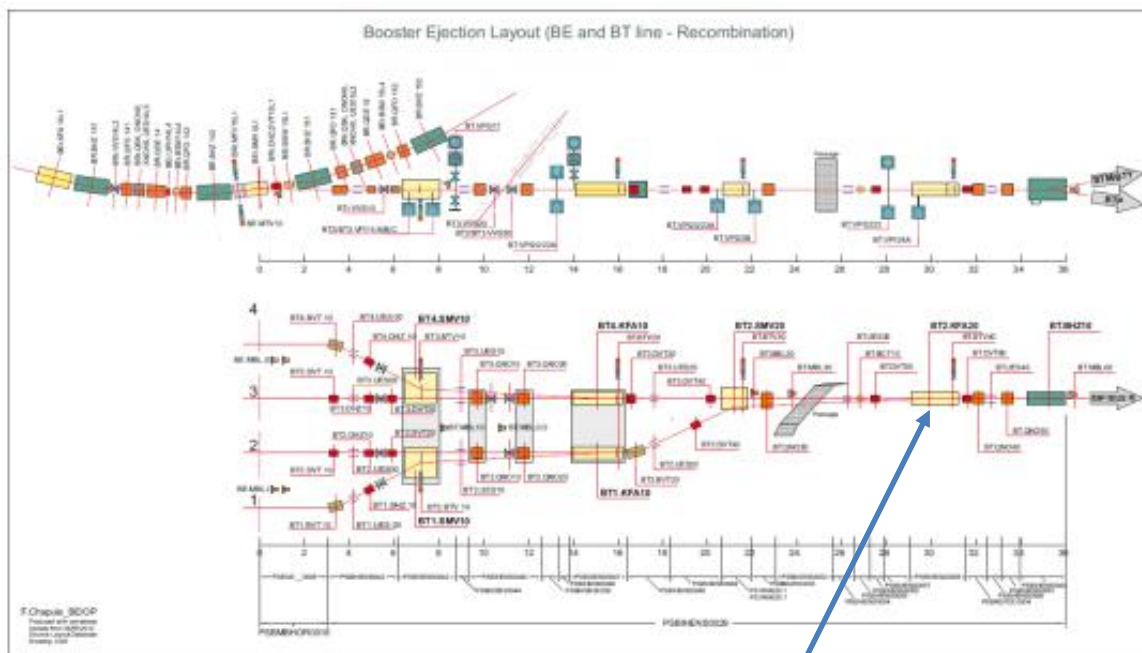
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- Present system layout and parameters.
- Foreseen configuration for LIU 2GeV.
- Modifications for STAGISO.



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BT2.KFA20 Layout & System parameters

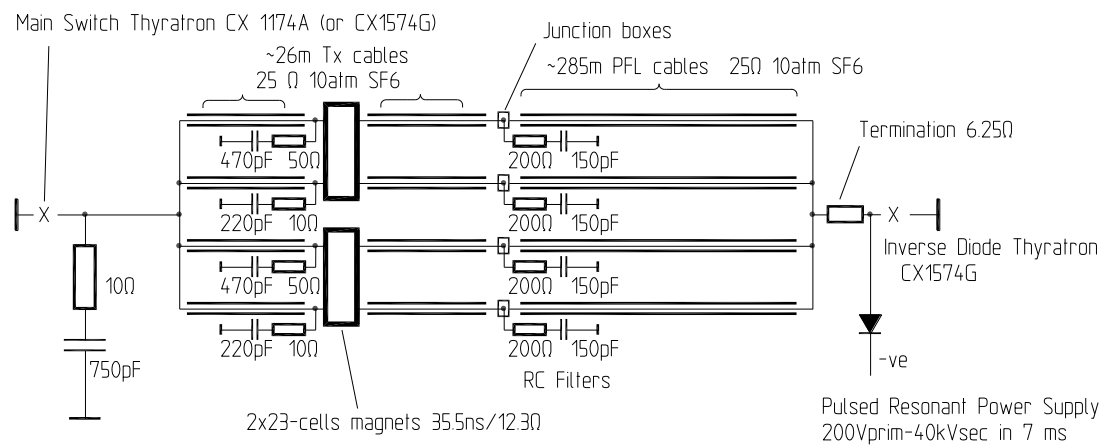


- One vacuum tank containing two magnets.
- PSB ring extraction sequence: 3 4 2 1 (2&1 kicked by KFA20).



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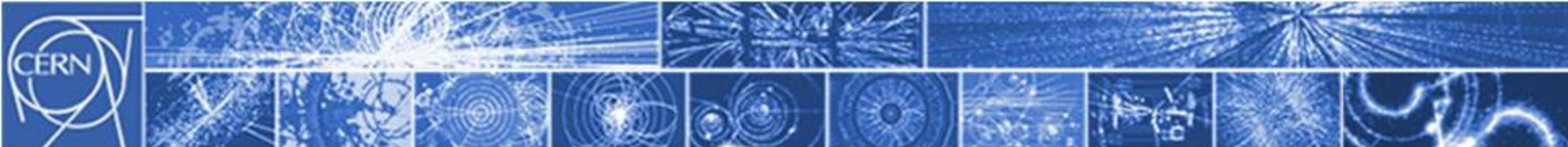
BT2.KFA20 Layout & System parameters



TK2-2016

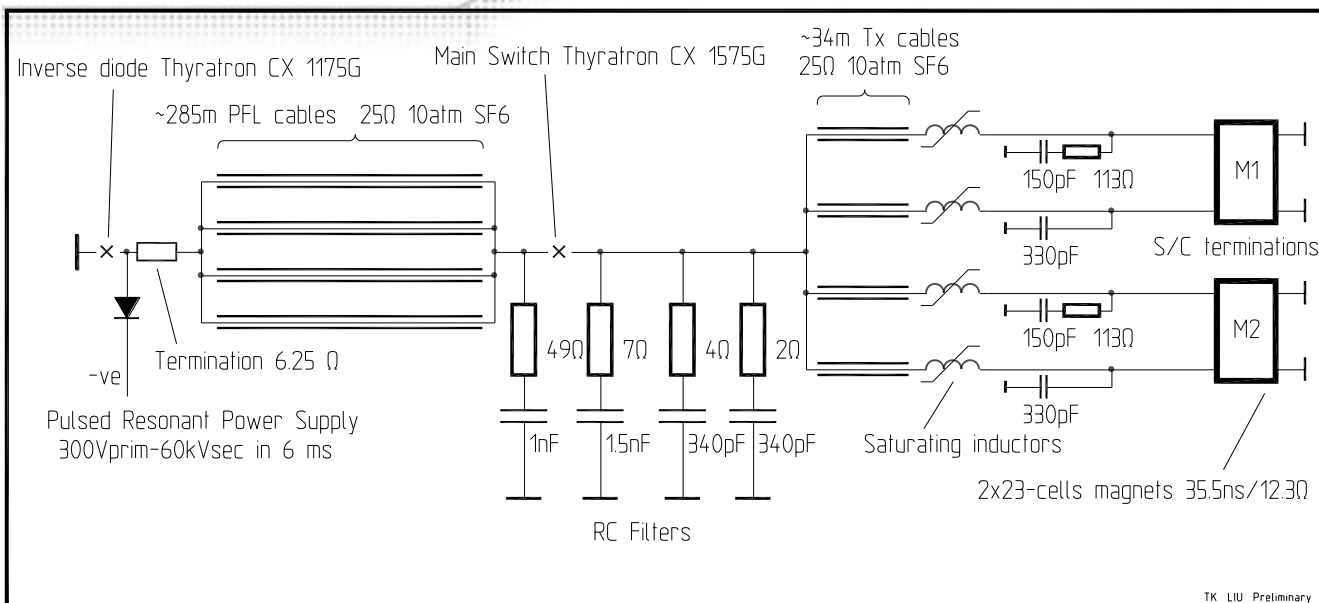


- 1 generator (magnets are charged with the Pulse Forming Line).
- PFL made of 4x25 W SF₆ filled cables in //.
- Transmission cables same type as PFL.
- Maximum design voltage 37 kV (magnet breakdown if higher). Voltage for 1.4GeV: ~28kV (4480A in switch).
- Pulse length ~3000 ns (fixed, not long enough for STAGISO).



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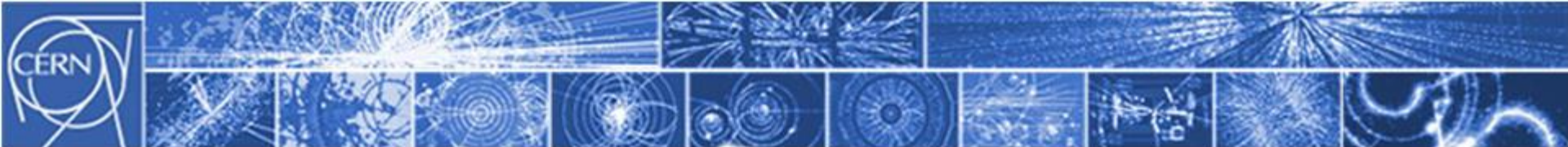
BT2.KFA20 Foreseen configuration for LIU 2GeV



Reconfiguration of the existing generator with minimisation of cost and manpower.

LIU requires 30% more kick.

- 1 generator (magnets are now pulsed).
- PFL made of 4x25 W SF₆ filled cables in //.
- Transmission cables same type as PFL.
- Maximum voltage 60kV. Thyatron current: 9600A.
- Kick rise time (2-98)%: 105ns.
- Kick flat-top ripple: ±2%.
- Kick length ~3000 ns (fixed , not long enough for STAGISO).



STAGISO requirements

- Beam kinetic energy: 1.4GeV.
- Bunch spacing: 16 μ s.
- Kick rise time: <16 μ s.
- Kick pulse flat-top quality to be confirmed by ISOLDE team. Is a ripple of $\pm 5\%$ acceptable?
- Kick length <456ns to be confirmed.

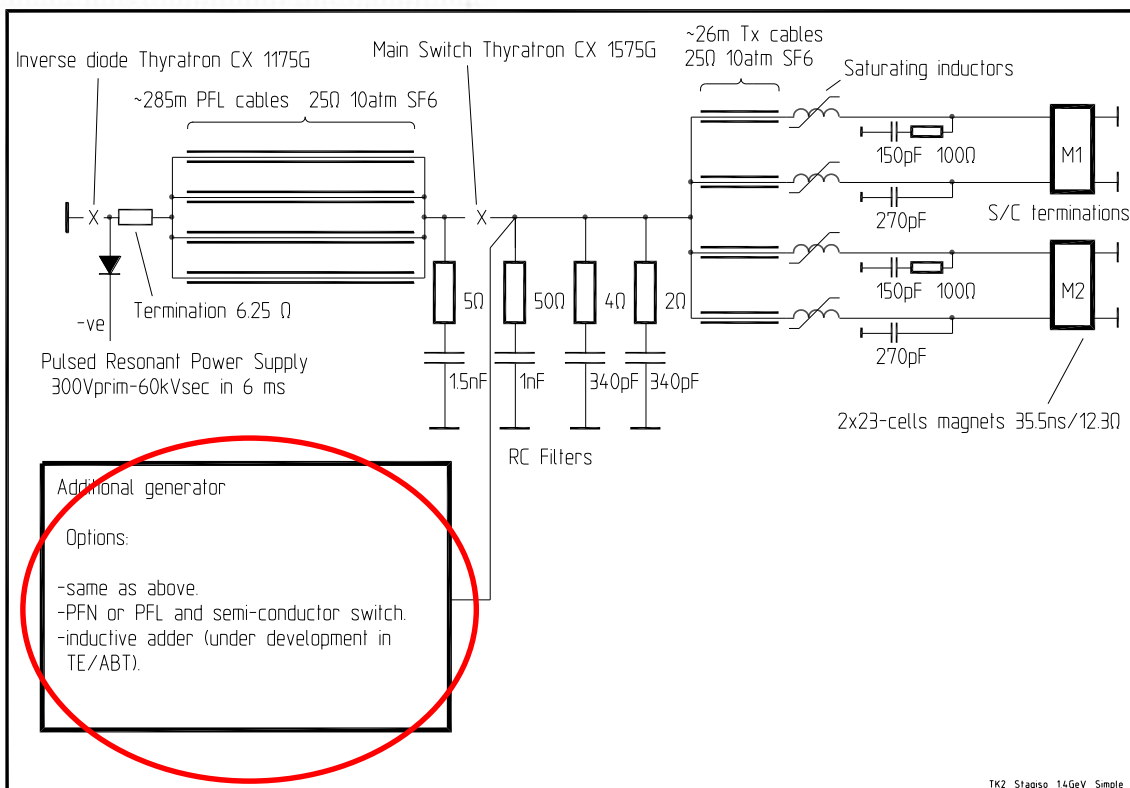
Limitations of present system

- PFL charging cycle is 9ms -> impossible to kick twice with a delay of 16 μ s.
- Maximum kick length $\sim 3\mu$ s -> not long enough to cover 16 μ s.



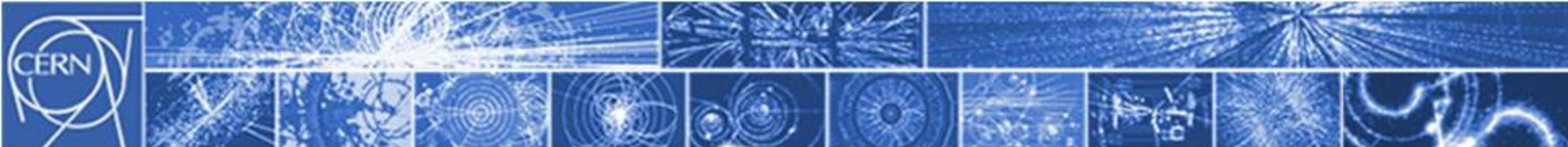
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BT2.KFA20 Modifications for STAGISO



**Additional generator
needed without any
impact on the LIU
performance.**

- to be tested in the lab.
- study cannot start before 2021 (after LS2).



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BT2.KFA20 Modifications for STAGISO



- Option 1: actual generator duplication.
To be avoided because expensive due to the use of thyatron switches.
- Option 2: use of PFL or Pulse Forming Network and semi-conductor (GTO) switches.
- Option 3: use of an inductive adder presently under development in TE/ABT.

Beware that none of the above options will be cheap.

Cost estimate: 500kCHF to 1 MCHF.

Manpower: 3 to 4 FTE.

Implementation: not before LS3.