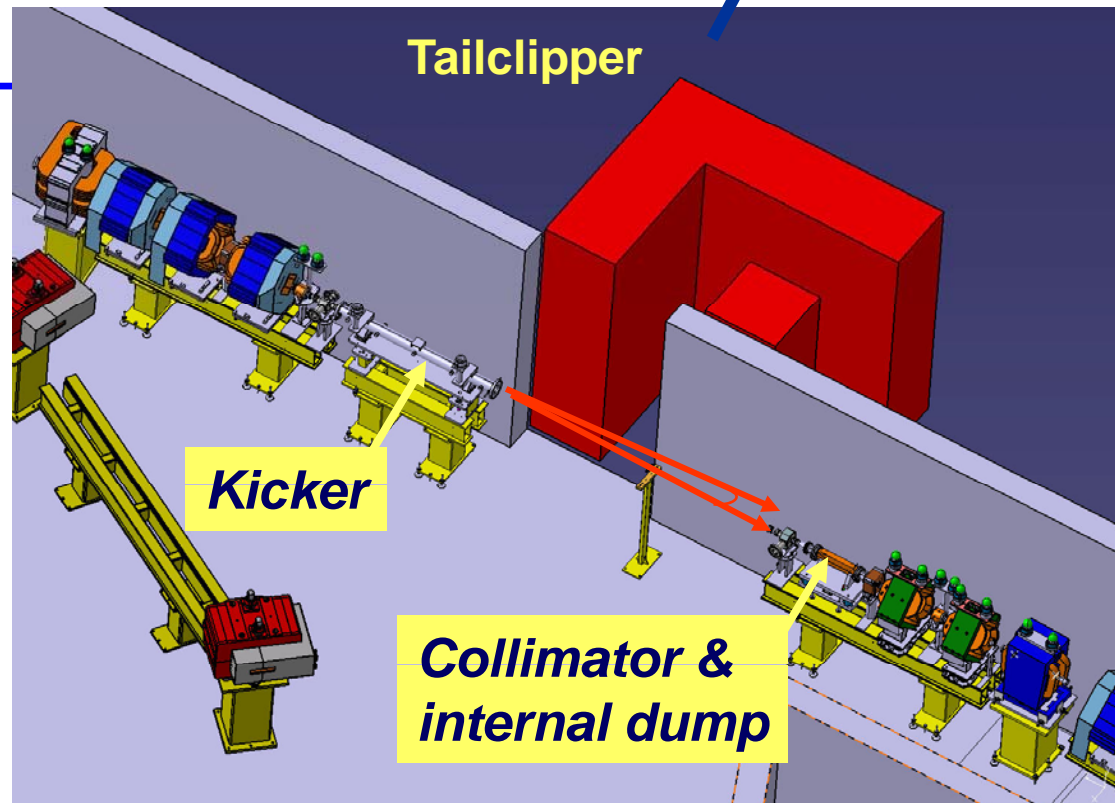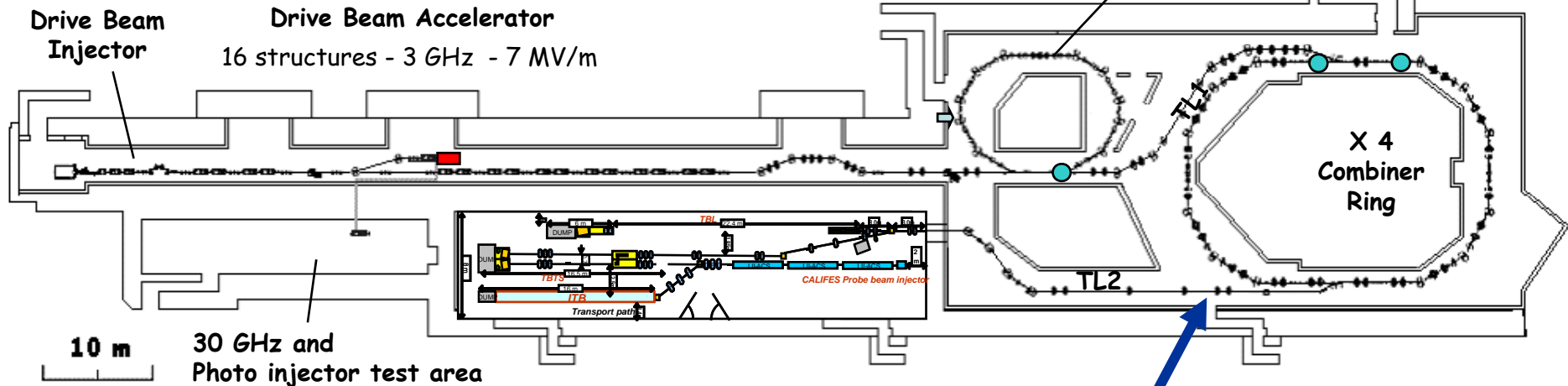# Tail Clipper

Hans Braun, CTF3 collaboration meeting, 22.1.2008

CTF3 complex

Drive Beam
Injector

Drive Beam Accelerator
16 structures - 3 GHz - 7 MV/m

X 2 Delay Loop

X 4
Combiner
Ring

TL1

TL2

DUMP

TBL

TBTS

ITB

CALIFES Probe beam injector

Transport path

10 m

30 GHz and
Photo injector test area

Tailclipper

Kicker
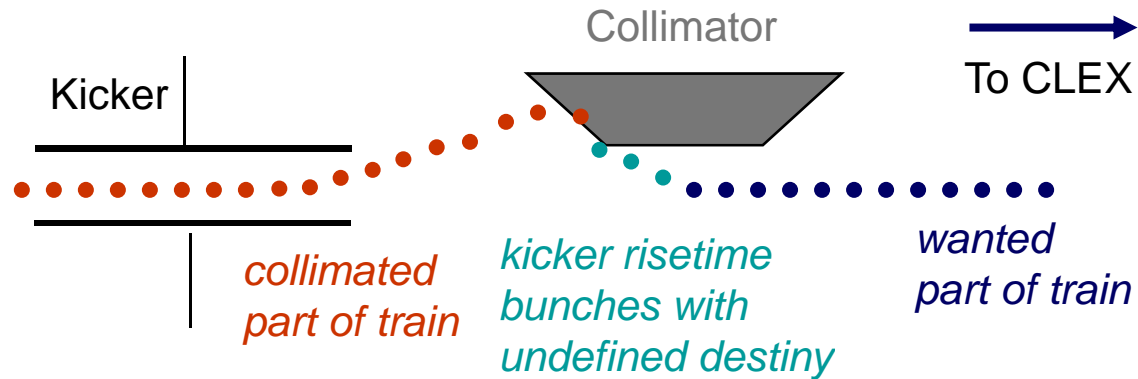
Collimator &
internal dump

Tailclipper has three functions

1. Adjusting bunch train length from CR. Necessary because CR imposes bunch train of 140 ns.
    In CLEX this beam is used to generate 12 GHz RF in TBTS and TBL.
    For RF conditioning variable pulse length is highly desirable.
    Duration is adjusted with a fast kicker magnet of variable timing together with an adjustable single jaw collimator.

2. Provide an internal dump for safe installation work in CLEX during beam studies with the combiner ring. For this purpose the adjustable jaw of the collimator is completely moved in the beampipe, assuring that no beam can pass.

3. Safety measure in case somebody breaks access chain to CLEX during operation with beam in CLEX. Tailclipper goes rapidly to dump mode with failsafe mechanism.
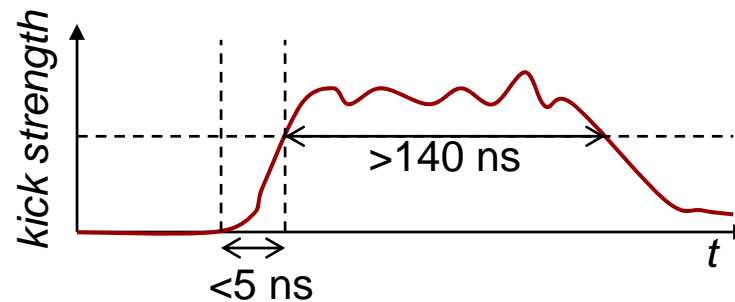
Mode tailclipper

Kicker

Collimator

Mode internal dump

Kicker off

Collimator

Tailclipper

Kicker

Collimator

To CLEX

collimated part of train

kicker risetime bunches with undefined destiny
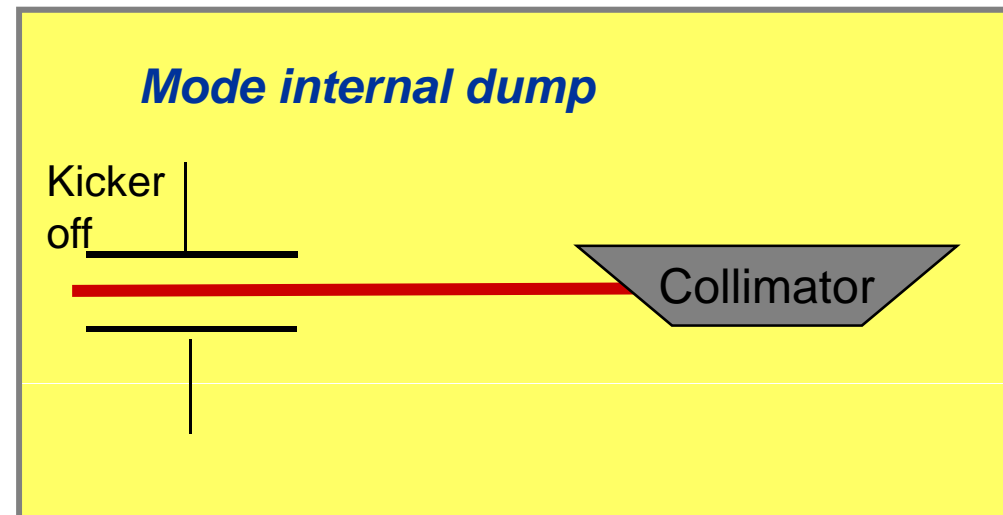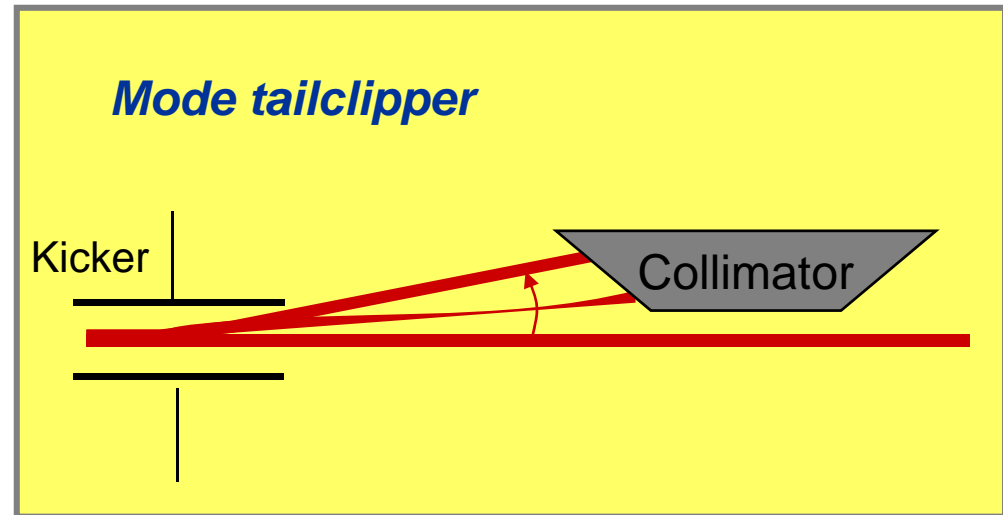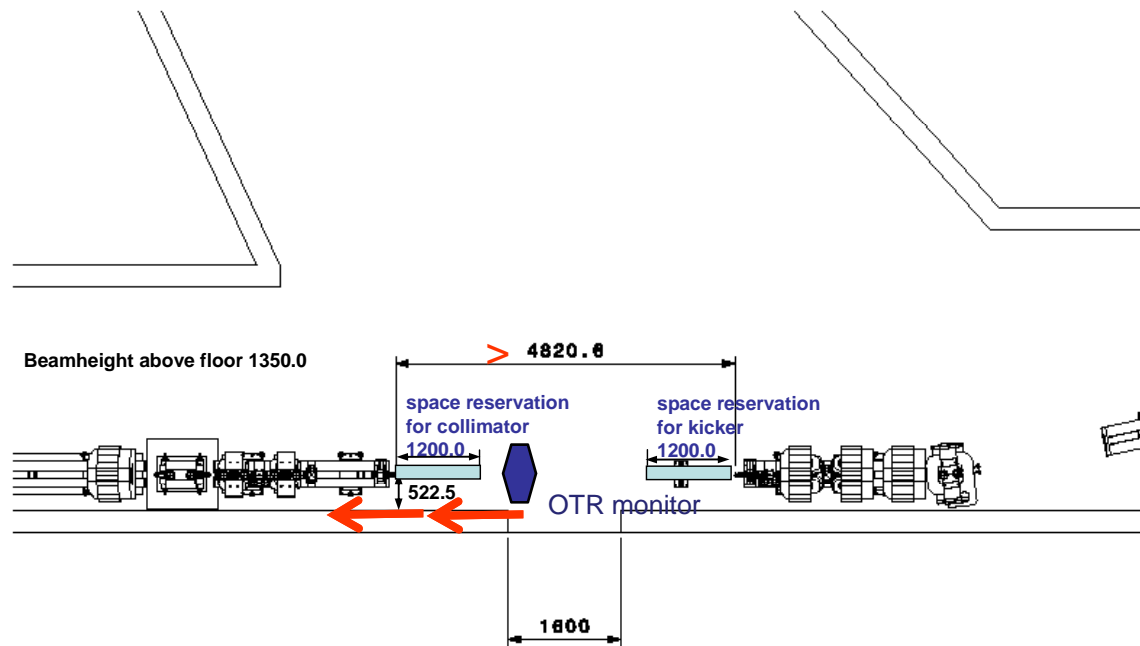
wanted part of train

Purpose: adjust length of drive beam pulse and therefore 12 GHz RF pulse
in Two Beam test Stand, as required for 12 GHz RF conditioning

Method: fast kicker which kicks unwanted part of 140 ns bunch train
into a fixed collimator.

Key requirements:

kick strength

>140 ns

<5 ns

t

Beamheight above floor 1350.0

> 4820.6

space reservation
for collimator
1200.0

space reservation
for kicker
1200.0

522.5

OTR monitor

1600

Beam parameters for tailclipper

Particle type	electrons
Beam energy	100-300 MeV
Repetition rate	0.8-5.0 Hz
Incoming puls duration	140 ns
Adjustment range in tailclipper mode	0-140 ns
maximum beam puls current	35 A
beam size range (rms, 1σ)	1-5 mm
Nominal vertical beamsize for tailclipper operation (rms, 1σ)	1 mm
Displacement of beam on collimator entry face due to kicker action	> 6 mm @ 200 MeV
maximum average beam power	3.7 kW
Inner aperture of diameter of upstream and downstream beam pipe	40 mm