MP meeting – Crystal collimation MD

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Motivation

- Last 30th August crystals were tested for the first time in LHC at injection energy.
    - Both crystals showed the standard channeling behaviour as expected
    - Several measurements were performed to check the crystal properties
    - Test of crystals with reduced collimation test were performed
- In this MD we want to test crystals at flat top energy.
    - The first test is to see the standard channeling behaviour (losses reduction)
    - We will follow the same program of the last MD
        - ❑ Crystal alignment
        - ❑ Set crystal closer then TCPs
        - ❑ Angular scan with ADT blow up of single bunches
        - ❑ Collimator scan with crystal in channeling
        - ❑ Open TCSG only when channeling established and checked as expected
    - Repeat at flat top the measurements performed at injection energy for comparison
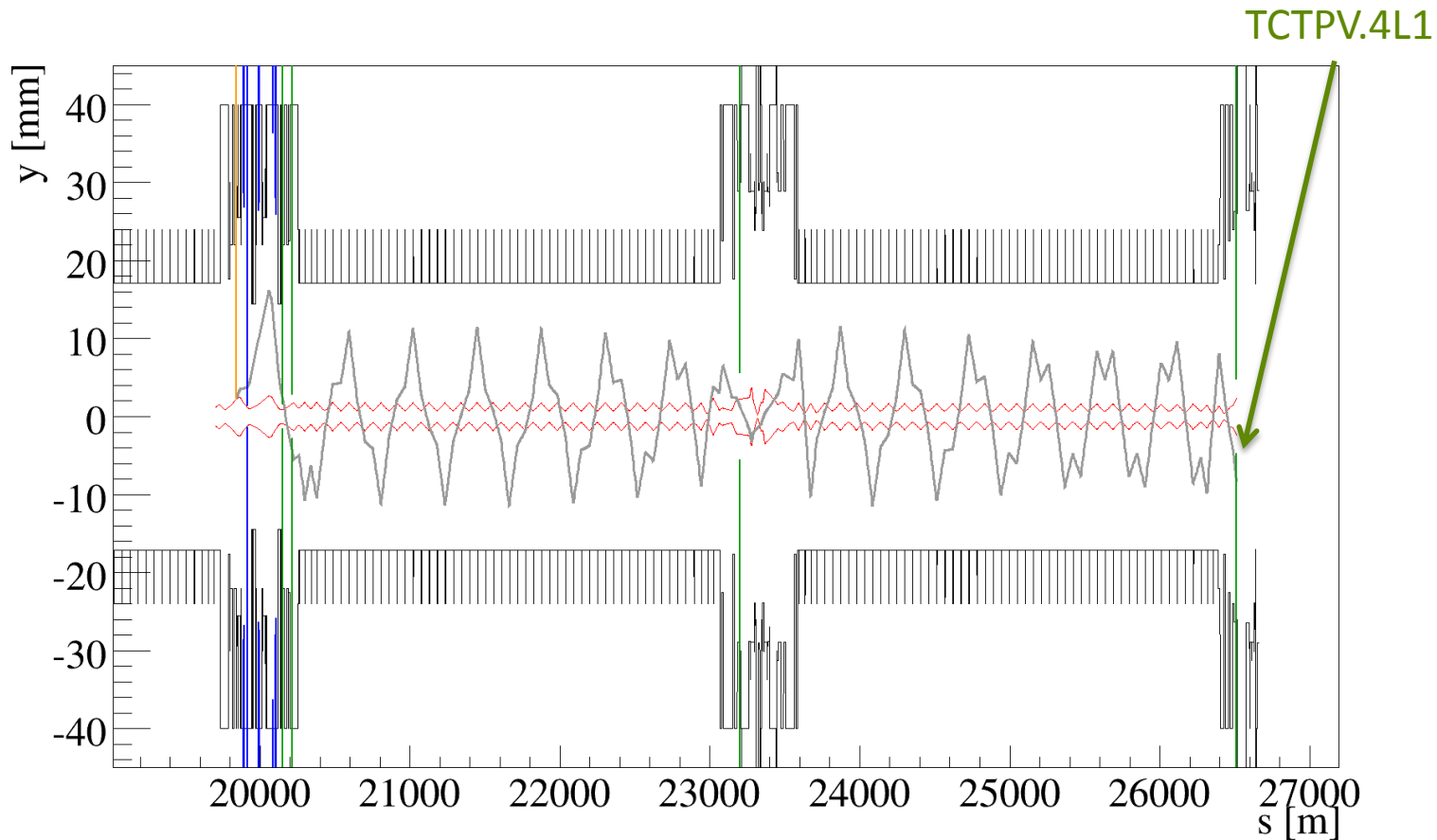
MD condition

Number of MD's	1
Time required per MD [h]	8
Beams required [1, 2, 1&2]	1
Beam energy [GeV]	450 & 6500
Optics (injection, squeezed, special)	Injection and flat top optics
Bunch intensity [#p, #ions]	Pilot
Number of bunches	~25 bunches well distributed, total intensity well below 3e11.
Transv. emittance [m rad]	3.0-3.5e-6
Bunch length [ns @ 4s]	1
Optics change [yes/no]	No
Orbit change [yes/no]	No
Collimation change [yes/no]	Yes: open most B1 secondary collimators in IR7.
RF system change [yes/no]	No
Feedback changes [yes/no]	No
What else will be changed?	Crystals moved into the beam, down to positions of about 5.5 sigmas, i.e. slightly close to the beam than the TCP (5.7 sigmas).
Are parallel studies possible?	Yes: only beam1 is used.
Other info/requests	No

MD program

Possible timeline :

- Preparatory checks at injection energy ~ 2 h;

- Prepare and perform energy ramp ~ 1 h;

- Crystal scans and collimator scans at flat top energy ~ 2.5 h for each crystal;
  - Collimator at nominal settings ~ 1.5 h
  - Selected TCPs and TCSGs retracted ~ 0.5 h
  - Loss maps measurement ~ 0.5 h;

NB These time estimations can vary, depending on what experimentally observed.

TCTPV.4L1

Horizontal plane

TCTPH.4L8