# MPS envelope for CODs

- This year we should give a clear envelope for faulty orbit correctors at injection – i.e. <u>above which kick strength they must be repaired</u> to continue operation wrt <u>continuing with a bump in the machine</u>.

- The margins must take into account the total aperture and the margins needed for:

  - Injection protection
  - Injection oscillations
  - Orbit interlocks
  - Missing COD bumps <<<
  - COD must not affect 'vital' systems (collimation, LBDS, Xing and separation bumps...).

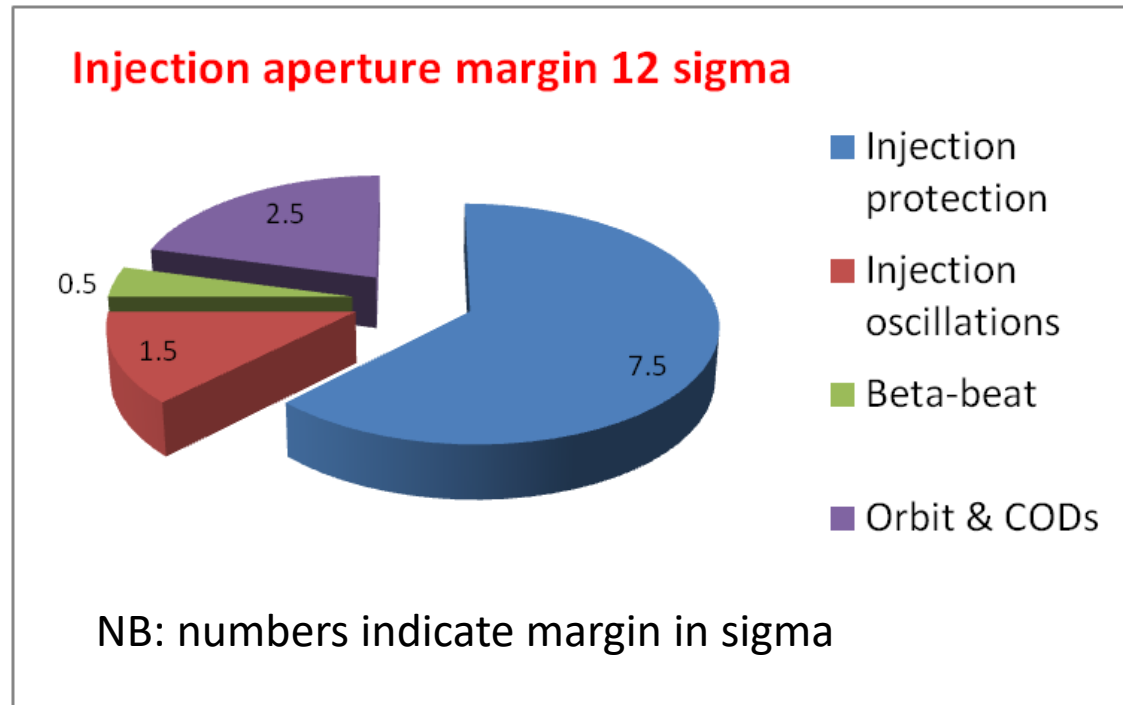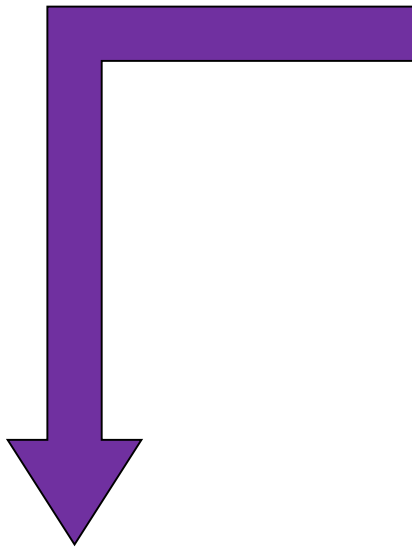- Injection protection (TCDI): assume 7.5 sigma (from V. Kain et al)
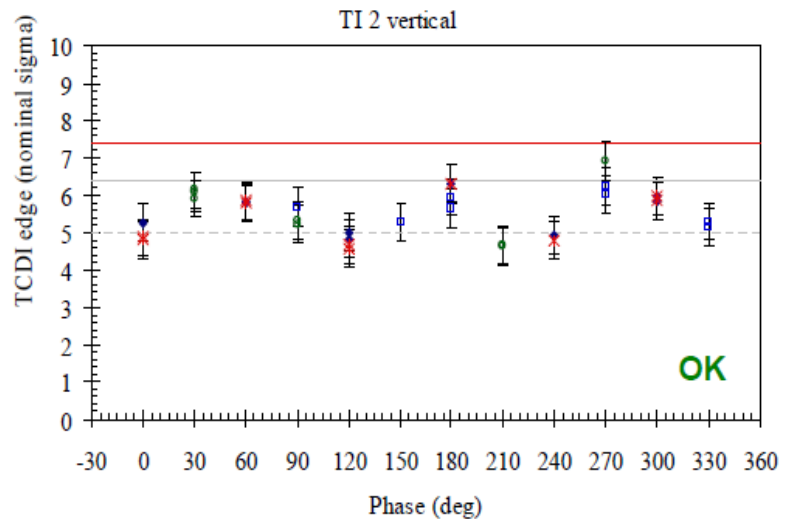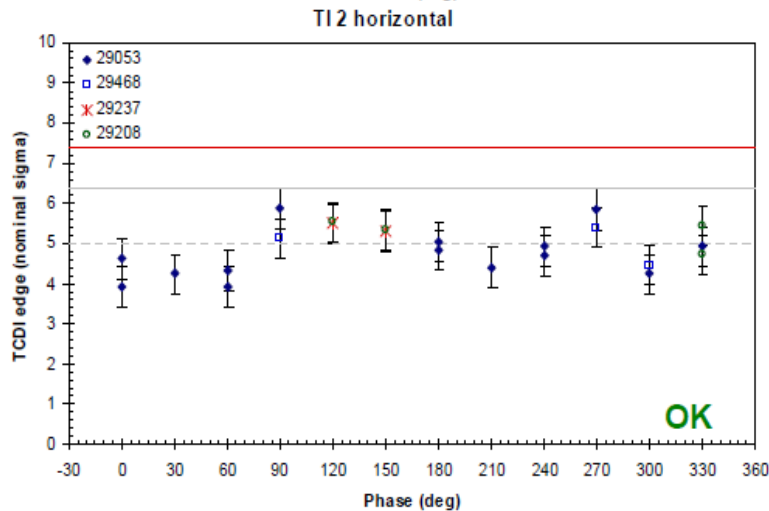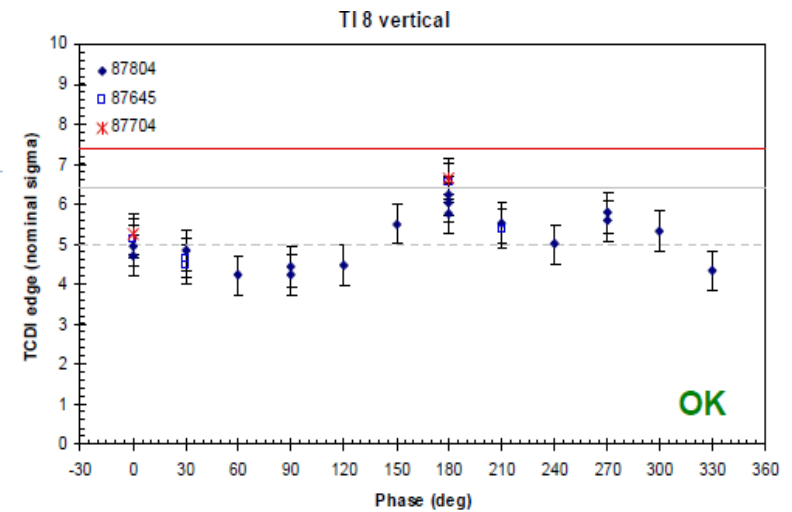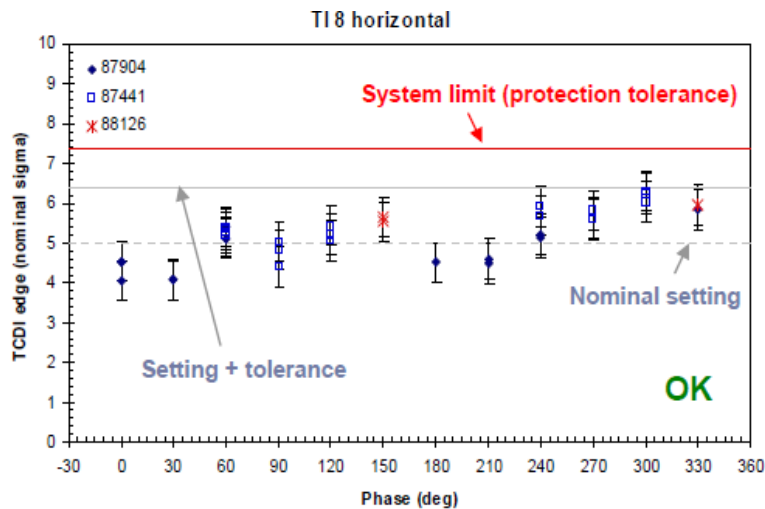
- In the arcs, a missing COD will lead to a creation of 2 π-bumps. The limit on the COD is defined by the max. excursion.
  - Plus keep a margin of 0.5 sigma (0.5 mm) for orbit (on top of missing COD effect).
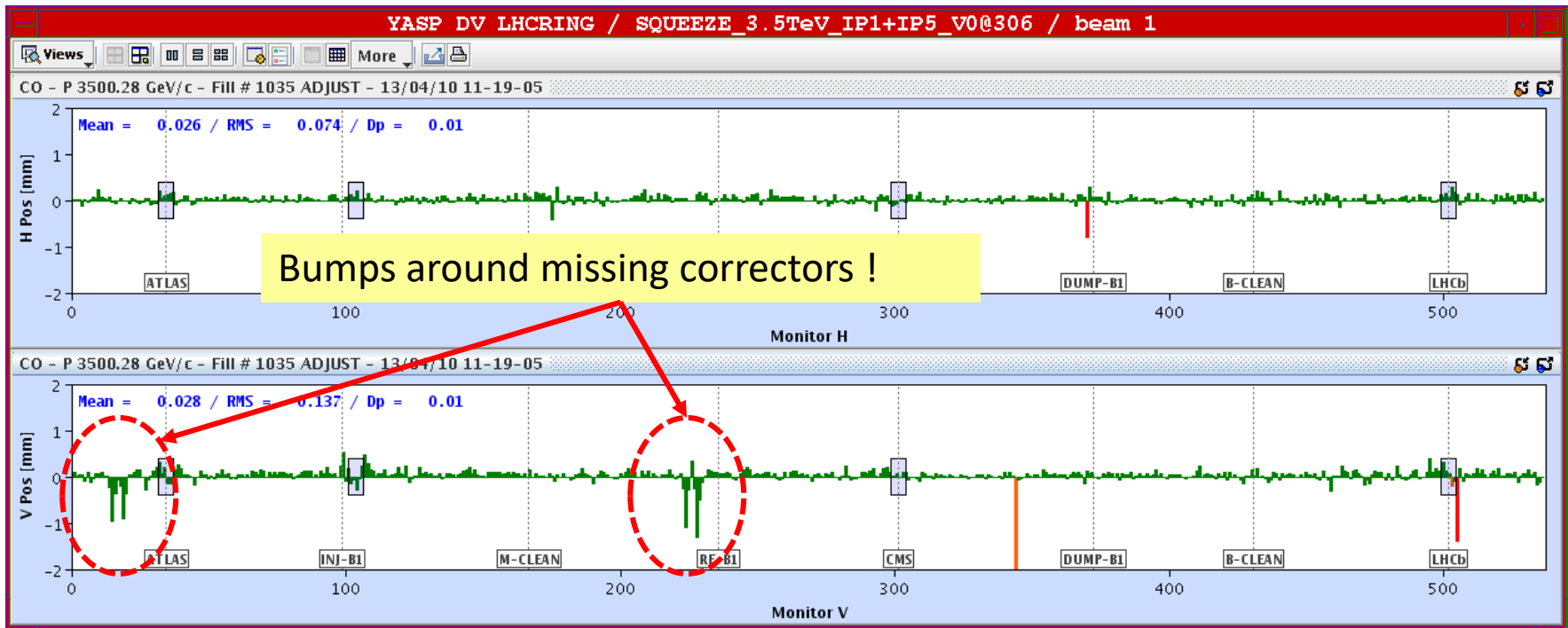
- Possible splitting of the total aperture margin at injection (assumed here to be 12 sigma) into the different components.

    - NB: 1 sigma ≈ 1 mm

**Injection aperture margin 12 sigma**

- Injection protection
- Injection oscillations
- Beta-beat
- Orbit & CODs

NB: numbers indicate margin in sigma

- This translates into a maximum missing kick of 22 microrad.

- Dependence of maximum kick on margin used for injection protection.

Injection protection margin (sigma)	Max. missing kick (urad)	% CODs above max. kick
7.5	22	7
8	16	24
8.5	11	39

Open inj. protection by 0.7 sigma
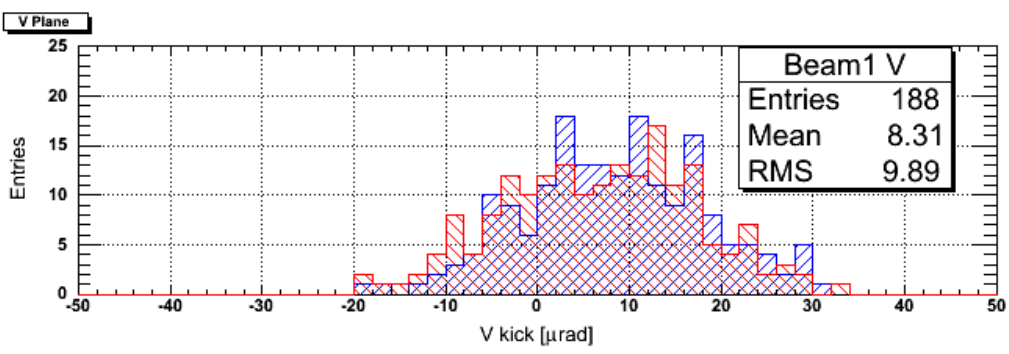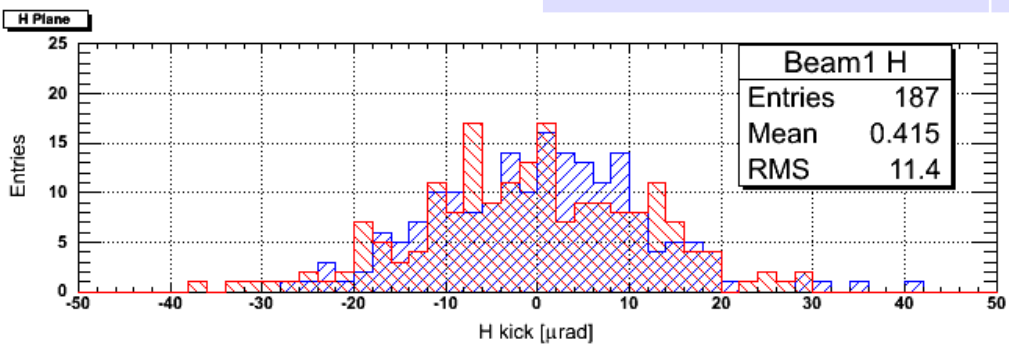
Kick distribution for 2010 ion orbit at injection

Tentative first order envelope – <u>to be finalized for end of March !</u>

- CODs must be repaired if:
  - LSS1/2/5/8: located between Q8.L and Q8.R.
  - LSS3/7 : if it affects the collimation (exact limit to be verified).
  - LSS6 : between Q8.L and Q8.R (tbc).
  - LSS4 ? Damper !!
  - Rest of the machine: if the missing kick is larger than XX microrad at injection – exact value to be defined.

  - What if the COD falls into none of those categories and is PICed (120 A)?

(There is now also a simple tool in the CCC steering that allows the OP crews to evaluate the impact of a missing COD in a few clicks.)