SINGLE-BUNCH INTENSITY LIMIT IN THE LHC

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Most critical case = TMCI at 7 TeV (computations done for the nominal beam parameters, i.e. also nominal bunch length…) => SB TMCI intensity threshold. Note that the CB TMCI intensity threshold should be lower (still to be studied in detail)

- Phase 1 (nominal collimators’ settings):
  - $Q' = 0 + I_{oct} = 0$ A => $N_{bth} \sim 3.4E11$ p/b
  - $Q' = 2 + I_{oct} = 550$ A => ($\sim 3.4E11$ p/b $< N_{bth} < \sim 3.9E11$ p/b)

- Phase 2 (copper secondary collimators) => Preferred option: see p. 13 of [http://indico.cern.ch/getFile.py/access?contribId=7&resId=1&materialId=slides&confId=55195](http://indico.cern.ch/getFile.py/access?contribId=7&resId=1&materialId=slides&confId=55195)
  - $Q' = 0 + I_{oct} = 0$ A => $N_{bth} > 4.5E11$ p/b (still to be defined if needed…)
  - $Q' = 2 + I_{oct} = 550$ A => $N_{bth} > 4.5E11$ p/b (still to be defined if needed…)
- **IR3MBC** (see [http://emetral.web.cern.ch/emetral/ICEsection/Meeting_24-11-10/IR3MBC_ICE_meeting_24112010.ppt](http://emetral.web.cern.ch/emetral/ICEsection/Meeting_24-11-10/IR3MBC_ICE_meeting_24112010.ppt))
  - $Q' = 0 + \text{loct} = 0$ A => $N_{th} \sim 1.4E11$ p/b

- Phase 1 (with tightest collimators’ settings proposed by RalphA for the 2011 collimation review):
  - $Q' = 0 + \text{loct} = 550$ A (and emitt = 2 $\mu$m) => $N_{th} \sim 1.8E11$ p/b

REMINDER: The best way to reduce the collimators’ impedance remains to open the gaps (and reduce the total length of the collimators)!

Smaller impedance effects if larger betas (S. Fartoukh)