

# Ultimate parameters for HL-LHC system design

Ultimate levelled luminosity  $\rightarrow 7.5 \cdot 10^{34}$  (1.5 $\times$  leveled nominal HL-LHC) pp

Peak heat deposition

Peak Cryogenic power

Electronics equivalent hadron flux

Ultimate integrated luminosity  $\rightarrow 4000 \text{ fb}^{-1}$  (1.33 $\times$  nominal HL-LHC) pp

System radio resistance

System lifetime  
(longer machine life)

Ultimate bunch intensity / emittance  $\rightarrow 2.33 \cdot 10^{11} / 1.37 \mu\text{m}$

Cleaning

Impedance

Protection

Ultimate design loss rates on collimators  $\rightarrow 0.8 \cdot 10^{11} \text{ p/s}$  ("steady state" lifetime 1 h)  $4 \cdot 10^{11} \text{ p/s}$  (over 10 s, lifetime 0.2 h)

Cleaning design

Hardware powering required for reaching 7.54 TeV, corresponding to a MB field of 9T

Design of magnet and cold masses

Full circuit design  
including insulation

EE, QDS, QPS, ...