

# LHC electron cloud studies - work plan

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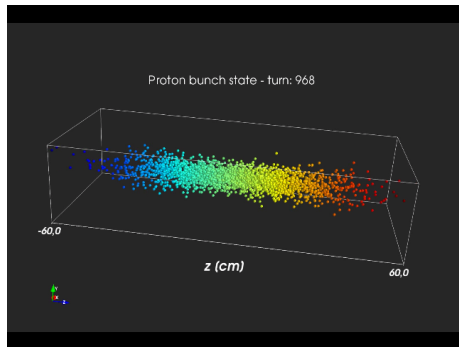
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# Proposed studies

- 1 Energies: [0.45, 4, 7] TeV
- 2 Reproduce Elena's studies for 0.45 TeV:
  - Scan over ecloud density:  $[2, 4, 6, 8, 10] \cdot 10^{11} \text{ m}^{-3}$
  - Scan over intensity:  $[0 : 1.1] \cdot 10^{11}$
  - Scan over chromaticities: [2, 10, 15, 20, 25, 30, 40]
  - Fast instabilities threshold and rise times
  - Tune footprint analysis  $\rightarrow$  coherent and incoherent tune shift
- 3 Repeat for other energies/settings

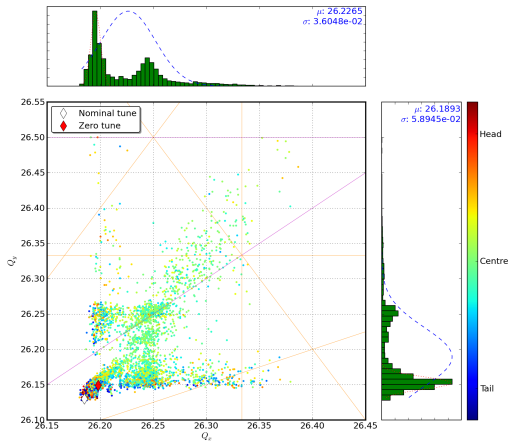


# Examples tune footprint analysis

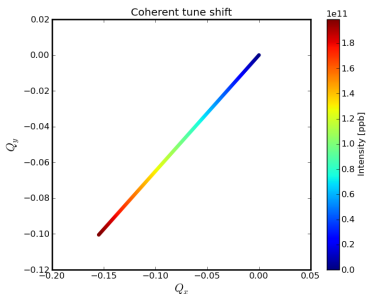


# Examples tune footprint analysis

Electron cloud 2D dynamics - Electrons:  $1.00e+12/m^3$ , Protons:  $1.32e+11$



# Examples tune footprint analysis



$$\Delta Q_u = \frac{N r_p R}{2\pi B Q_u \beta^2 \gamma^3 \sigma_u (\sigma_x + \sigma_y)}$$

$$r_p \approx 1.53500675753e - 18\text{m}$$

$$B = \frac{\sqrt{2\pi} \sigma_z}{2\pi R}$$

