Beampipe-averaged Cloud Density ($10^{12}$ m$^{-3}$)

Electron Density ($10^{12}$ m$^{-3}$)

Time (ns)
Macroparticle Statistics

Number of Macroparticles ($10^3$) vs. Time (ns)

- Number of Macroparticles ($10^3$) range from 0 to 12.
- Time (ns) range from 0 to 20,000.

The graph shows a periodic pattern with peaks occurring at specific intervals.
Beam-averaged Cloud Density ($10^{12} \text{ m}^{-3}$)

**Time (ns)**

**Electron Density ($10^{12} \text{ m}^{-3}$)**

- 0
- 0.2
- 0.4
- 0.6
- 0.8
- 1
- 1.2

- 0 2500 5000 7500 10000 12500 15000 17500 20000

*Graph of electron density over time.*
5-Sigma Cloud Density at Center of Pipe ($10^{12} \text{ m}^{-3}$)

![Graph showing electron density versus time. The y-axis represents electron density in units of $10^{12} \text{ m}^{-3}$, while the x-axis represents time in nanoseconds.]
ECLOUD-TS0608_SEY20_Epk310: Cloud Density in Central Grid Cell ($10^{12}$ m$^{-3}$)

Electron Density ($10^{12}$ m$^{-3}$) vs. Time (ns)

- X-axis: Time (ns)
- Y-axis: Electron Density ($10^{12}$ m$^{-3}$)

The graph shows periodic fluctuations in electron density over time, with peaks at various time intervals.
Cloud charge snapshot after bunch 1 at time = 14 ns

No energy cut: 1000 macroparticles, 178552896 e-

$E_{\text{kin}} > 10 \text{ eV}: 57 \text{ macroparticles, } 40907888 \text{ e-}$
Cloud charge snapshot after bunch 2 at time = 28 ns

No energy cut: 1895 macroparticles, 316252480 e-

\[ E_{\text{kin}} > 10 \text{ eV}: 77 \text{ macroparticles, 74601816 e-} \]
Cloud charge snapshot after bunch 3 at time = 42 ns

No energy cut: 2599 macroparticles, 427383616 e-

$E_{kin} > 10$ eV: 86 macroparticles, 75599752 e-
Cloud charge snapshot after bunch 4 at time = 56 ns

No energy cut: 3136 macroparticles, 514235968 e-

$E_{\text{kin}}>10$ eV: 107 macroparticles, 105437848 e-
Cloud charge snapshot after bunch 5 at time = 70 ns

No energy cut: 3546 macroparticles, 597386176 e-

$E_{\text{kin}} > 10 \text{ eV}$: 116 macroparticles, 113860448 e-
Cloud charge snapshot after bunch 6 at time = 84 ns

No energy cut: 3850 macroparticles, 641515520 e-

\( E_{\text{kin}}>10 \text{ eV} \): 128 macroparticles, 131060144 e-
Cloud charge snapshot after bunch 7 at time = 98 ns

No energy cut: 4069 macroparticles, 686734528 e-

$E_{\text{kin}} > 10$ eV: 159 macroparticles, 150602352 e-
Cloud charge snapshot after bunch 8 at time = 112 ns

No energy cut: 4261 macroparticles, 742199360 e-

$E_{kin}>10$ eV: 180 macroparticles, 170640560 e-
Cloud charge snapshot after bunch 9 at time = 126 ns

No energy cut: 4487 macroparticles, 758626880 e-

$E_{kin} > 10$ eV: 172 macroparticles, 151825968 e-
Cloud charge snapshot after bunch 10 at time = 140 ns

No energy cut: 4666 macroparticles, 777436992 e-

$E_{kin}>10 \text{ eV}$: 190 macroparticles, 161660416 e-
Cloud charge snapshot after bunch 11 at time = 154 ns

No energy cut: 4772 macroparticles, 822200384 e-

$E_{kin}>10 \text{ eV}$: 195 macroparticles, 176693632 e-
Cloud charge snapshot after bunch 12 at time = 168 ns

No energy cut: 4955 macroparticles, 868911104 e-

$E_{kin} > 10$ eV: 219 macroparticles, 180721488 e-
Cloud charge snapshot after bunch 13 at time = 182 ns

No energy cut: 5127 macroparticles, 873136704 e-

$E_{kin} > 10$ eV: 230 macroparticles, 168310144 e-
Cloud charge snapshot after bunch 14 at time = 196 ns

No energy cut: 5219 macroparticles, 865548096 e-

$E_{kin} > 10$ eV: 231 macroparticles, 178529552 e-
Cloud charge snapshot after bunch 183 at time = 2562 ns

No energy cut: 1318 macroparticles, 388181760 e-

\[ E_{\text{kin}} > 10 \text{ eV}: 369 \text{ macroparticles, 241124464 e-} \]
Cloud charge snapshot after bunch 366 at time = 5124 ns

No energy cut: 1807 macroparticles, 600238592 e-

$E_{kin}>10$ eV: 833 macroparticles, 413566400 e-
Cloud charge snapshot after bunch 549 at time = 7686 ns

No energy cut: 2113 macroparticles, 694394624 e-

$E_{\text{kin}} > 10$ eV: 1184 macroparticles, 519235264 e-
Cloud charge snapshot after bunch 732 at time = 10248 ns

No energy cut: 2327 macroparticles, 787076288 e-

$E_{\text{kin}} > 10$ eV: 1434 macroparticles, 604868928 e-
Cloud charge snapshot after bunch 915 at time = 12810 ns

No energy cut: 2526 macroparticles, 862692928 e-

$E_{\text{kin}} > 10 \text{ eV}$: 1645 macroparticles, 708672768 e-
Cloud charge snapshot after bunch 1098 at time = 15372 ns

No energy cut: 2712 macroparticles, 894571776 e-

$E_{kin}>10$ eV: 1851 macroparticles, 734415360 e-
Cloud charge snapshot after bunch 1281 at time = 17934 ns

No energy cut: 2768 macroparticles, 899267200 e-

$E_{\text{kin}} > 10 \text{ eV}$: 1934 macroparticles, 754355968 e-
Cloud charge snapshot after bunch 1326 at time = 18550 ns

No energy cut: 11721 macroparticles, 2.93251e+09 e-

$E_{\text{kin}} > 10$ eV: 2994 macroparticles, 1359513856 e-
Cloud charge snapshot after bunch 1465 at time = 20496 ns

No energy cut: 2859 macroparticles, 915305728 e-

$E_{\text{kin}} > 10$ eV: 1995 macroparticles, 772921152 e-
ECLOUD-TS0608_SEY20_Epk310: Time-Integrated Energies of Electrons Hitting Wall

Entries: 501
Mean: 2.093
RMS: 6.754

Normalized Nr of Electrons per 1.6 eV

Percentage above energy cut (%)

Energy Cut (eV)
Average current density hitting wall: 657876 nA/cm²

Average power density hitting wall: 56 W/m²
ECLOUD-TS0608_SEY20_Epk310: Cloud Density (e/m\(^3\)) Averaged Over 20510 ns

Projection on X (cm)

Projection on Y (cm)
ECLOUD-TS0608_SEY20_Epk310: Electric Field at Beam
Electric Field Gradients at Beam

$\frac{dE_X}{dx}$ at Center (V/m$^2$)

$\frac{dE_Y}{dy}$ at Center (V/m$^2$)

Time (ns)

Time (ns)