

Z0 running at CEPC?

CEPC TDR parameters – 50 MW upgrade

- Ring 100 km -> time one circonference = 333.3 us
- 19918 bunches -> time between crossings = 15 ns (but 10% gap -> 16.735 ns)
- Lumi = $192 \cdot 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$
- Z^0 hadronic cross section = 30.5 nb; average multiplicity ~ 20
- # Z^0 per sec = 58560
- N_z /crossing = $9.8 \cdot 10^{-4}$
- TPC “primary electron memory” time = 35 us -> 2 hadr. Z^0 events
- TPC “primary pos. ion memory” time ~ 1 sec -> 58560 x 10 tracks /hemisphere
- ~ 10 k primary ions/track for 1 m tracklength -> total $5.8 \cdot 10^9$ primary ions
- TPC hemisphere volume = $20 \text{ m}^3 = 20 \cdot 10^6 \text{ cm}^3$
- Primary ion density ~ 300 ions/cm³