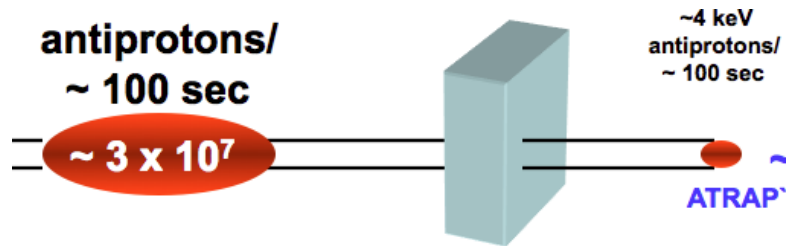


Introduction

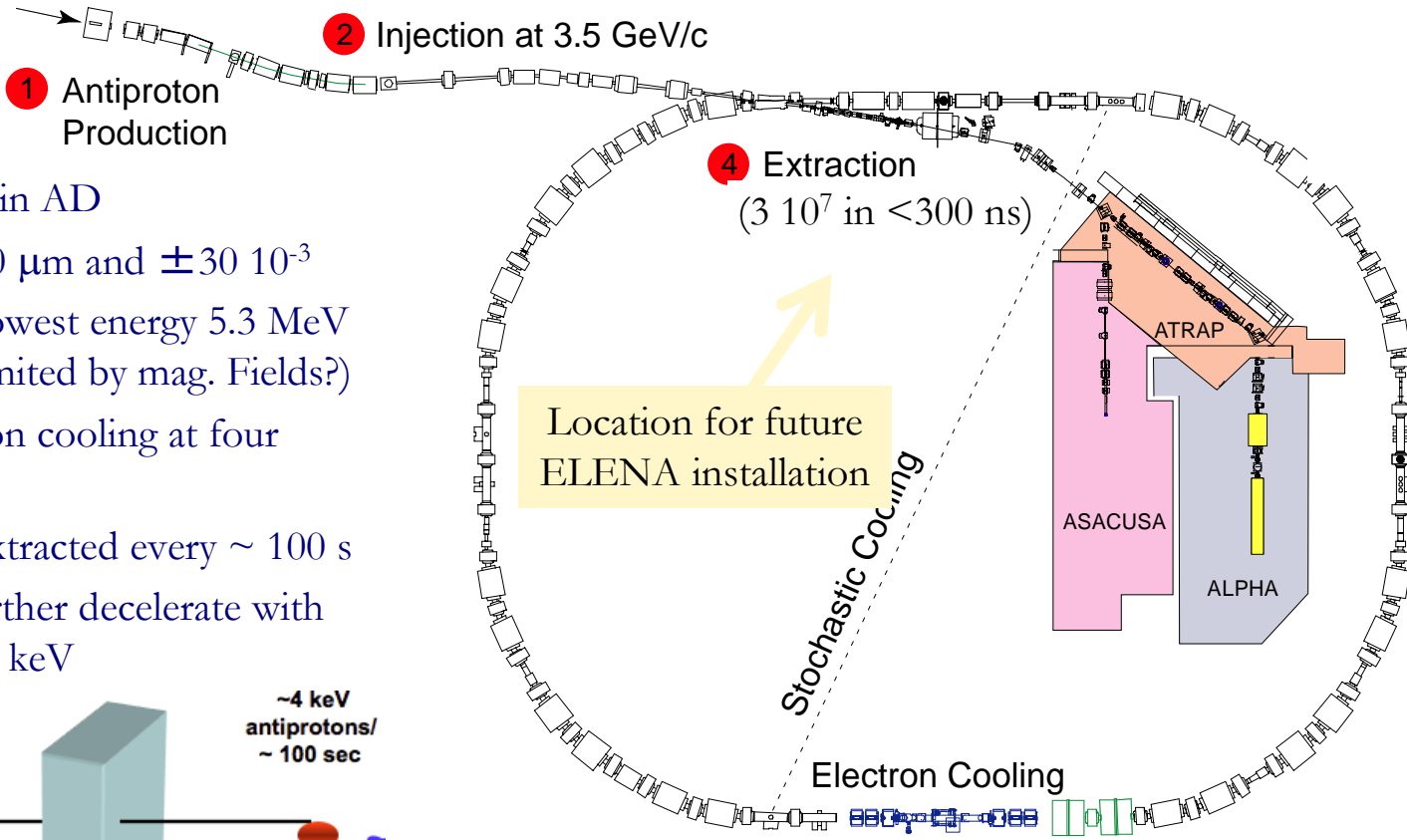
Present Antiproton Operation with AD



- $\sim 1.5 \cdot 10^{13}$ protons (26 GeV) on target
- $\sim 3.5 \cdot 10^7$ antiprotons in AD
 - Acceptances $200 \mu\text{m}$ and $\pm 30 \cdot 10^{-3}$
- Deceleration to the lowest energy 5.3 MeV reachable “safely” (limited by mag. Fields?)
- Stochastic and electron cooling at four different energies
- $\sim 3 \cdot 10^7$ antiprotons extracted every ~ 100 s
- Most experiments further decelerate with a “degrader” to a few keV

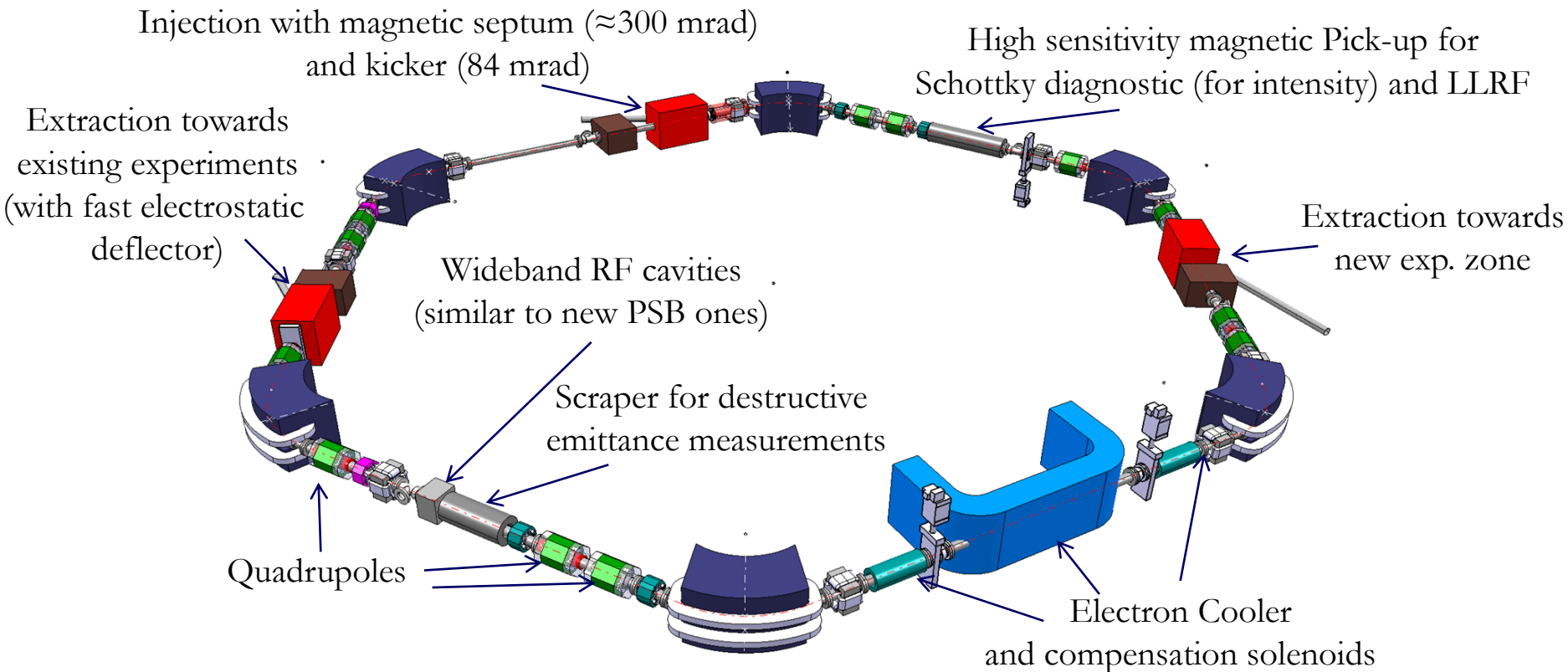


- Inefficient process (most antiprotons stopped or still with too high energy)
- Add Synchrotron ELENA with electron cooler for controlled deceleration to 100 MeV (& thin degrader)



Sketch of the present AD – circumference 182 m
- In addition experiment AEGIS installed
- Experiment BASE being installed

ELENA Overview



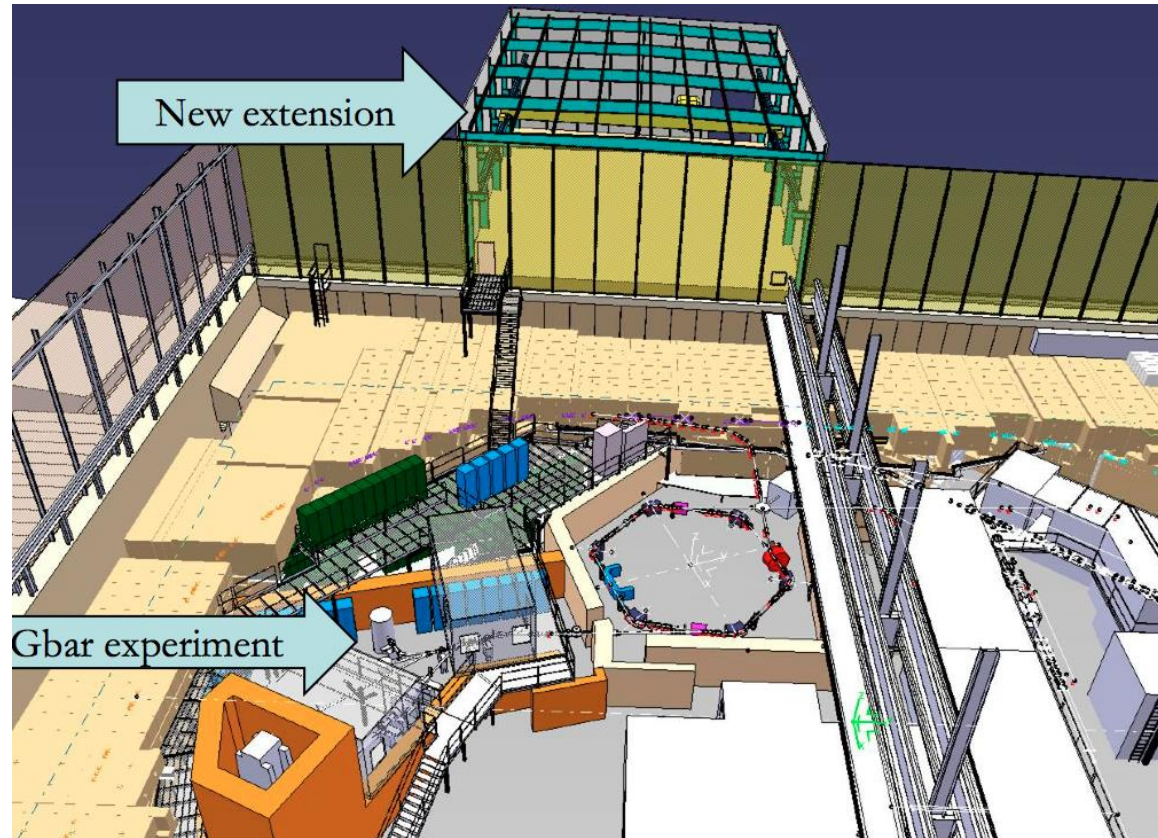
- Size a factor $\sim 10^3$ smaller than LHC, kinetic energy of beams for physics factor $\sim 10^8$ lower than LHC
- Circumference 30.4 m or 1/6 the one of the AD (\therefore 4 times the size of the first proposal in 1982!)
 - Allows installing all equipment required without particular efforts to gain space
 - Fits in the available space inside the AD hall
 - Lowest average field (beam rigidity over average radius) $B\rho/R = 94$ G smaller than for AD 115 G

ELENA Overview and Status



■ Main features and issues

- Synchrotron operated at unusual low energy 100 keV
- Commissioning mainly with external H⁻/proton source
- Electron cooling
- Intra Beam Scattering expected to be main limitation, rest gas significant with $3 \cdot 10^{-12}$ Torr
- Instrumentation for very low energy and intensity
- Very low magnetic field, small RF voltages
- Electrostatic transfer lines to experiments



■ Status and outlook

- TDR completed recently, component construction starting (first call for tenders for magnets out)
- Ring commissioning with source planned for 2nd half of 2016 with AD running mostly for physics
- Transfer line installation and commissioning and 1st physics run planned in 2017