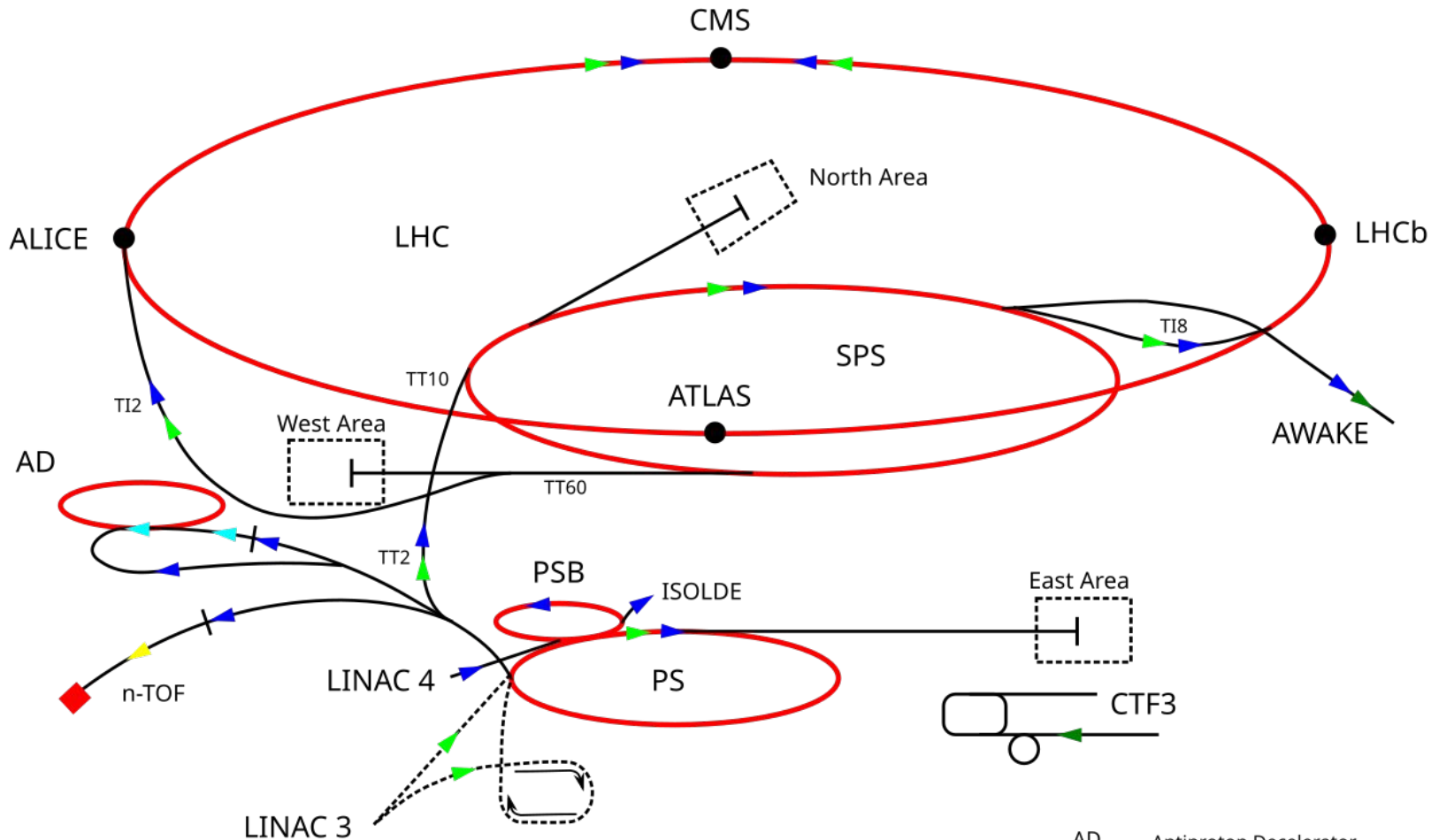


CERN and the secret Antimatter Factory





- ▶ protons
- ▶ ions
- ▶ neutrons
- ▶ antiprotons
- ▶ electrons
- ▶ neutrinos

- PS Proton Synchrotron
- SPS Super Proton Synchrotron
- LHC Large Hadron Collider

- AD Antiproton Decelerator
- n-TOF Neutron Time Of Flight
- AWAKE Advanced Wakefield Experiment
- CTF3 CLIC Test Facility 3

Antimatter Factory



AD (Antiproton Decelerator)

25 GeV protons hit a metal target producing antiprotons.

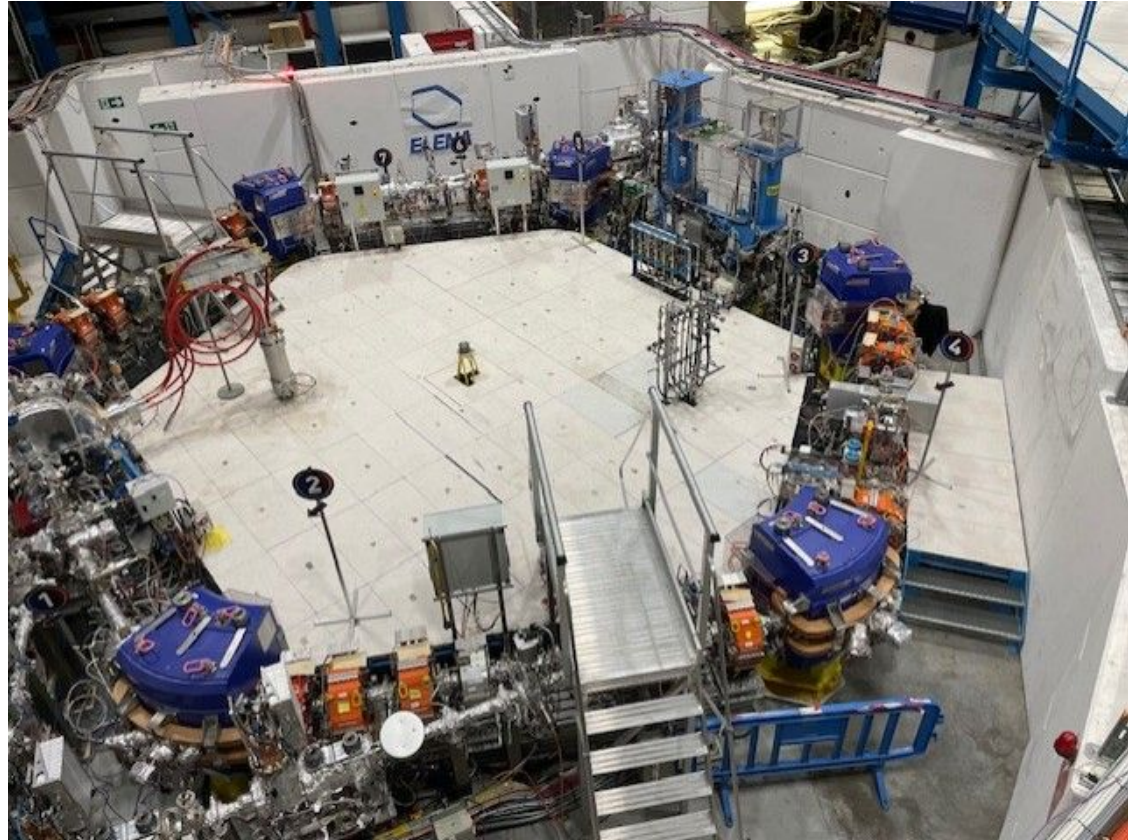
Antiprotons are focused into a beam

Antiprotons slow down from 3.5 GeV to 5.3 MeV



ELENA (Extra Low ENergy Antiproton)

Antiprotons decelerated from
5.3 MeV to 0.1 MeV

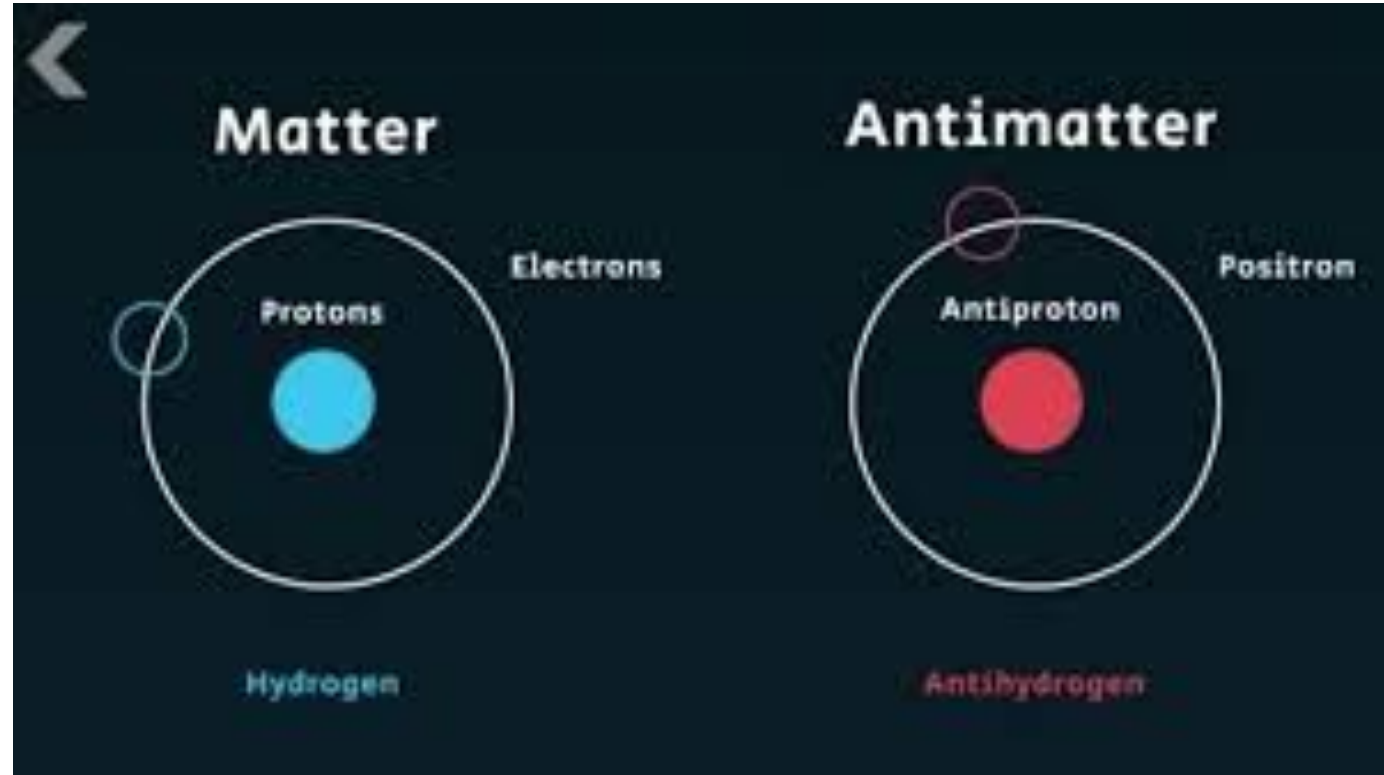


AEgIS

(AntiHydrogen Experiment: **g** gravity, **I**nterferometry, **S**pectroscopy)

Produces a beam of anti-Hydrogen

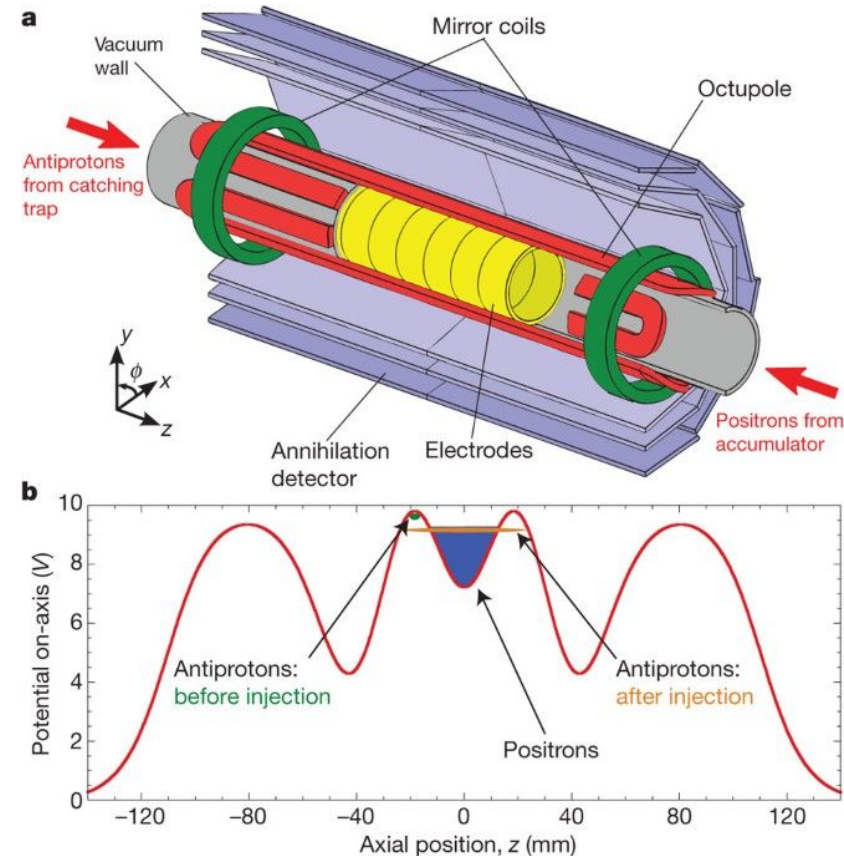
Measures gravity to 1% precision from an initial horizontal motion.



ALPHA (Antihydrogen Laser Physics Apparatus)

Can trap antihydrogen atoms for over 16 minutes.

Compares properties of antihydrogen to hydrogen.



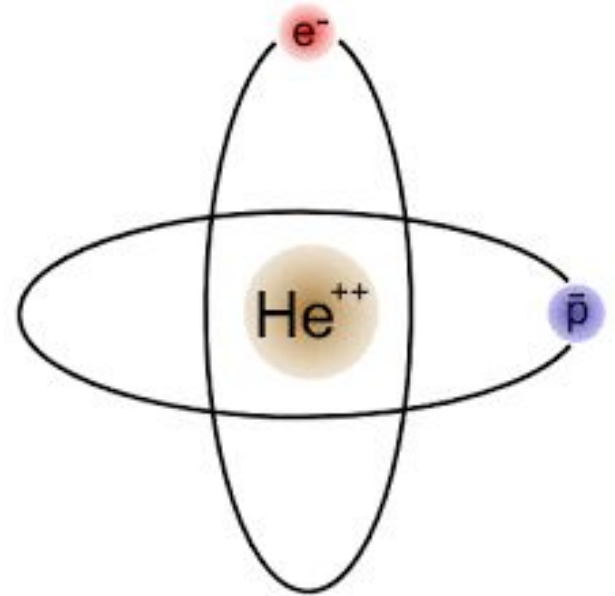
ASACUSA

(Atomic Spectroscopy And Collisions Using Slow Antiprotons)

Spectroscopy with antiprotonic Helium and antihydrogen.

Measures the hyperfine structure of antihydrogen.

Excites antiprotonic Helium to measure the mass of the antiproton.



BASE

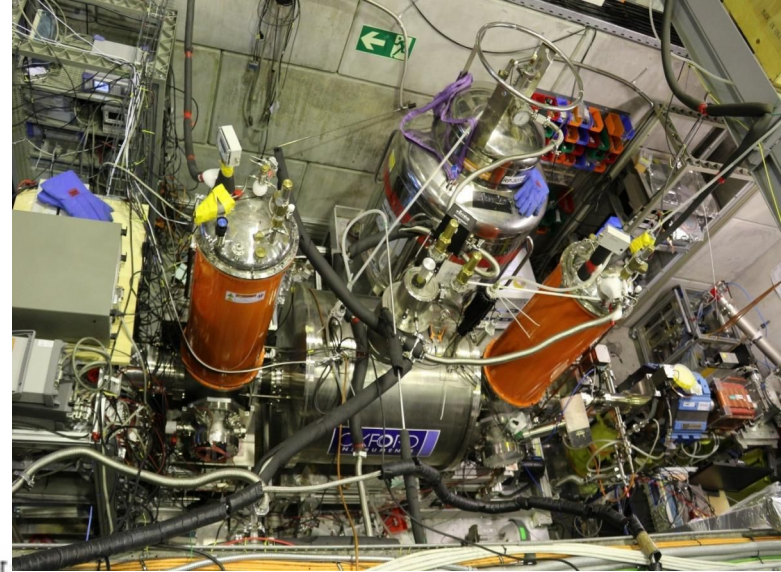
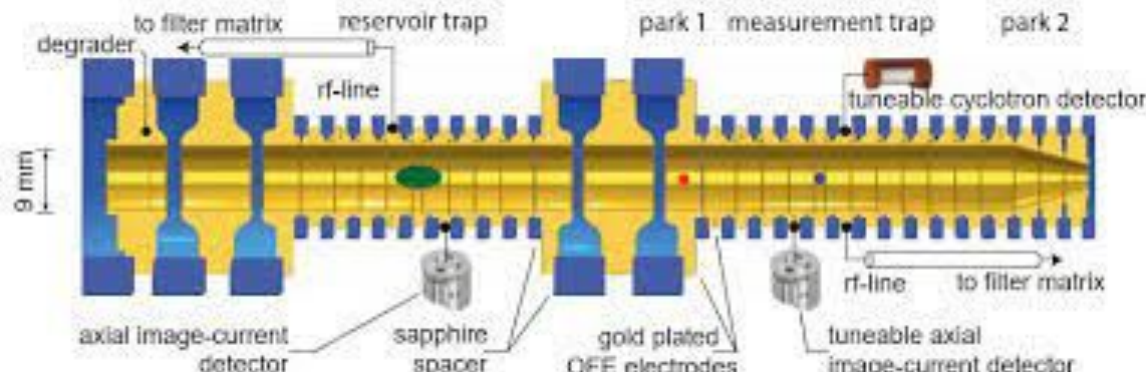
(Baryon Antibaryon Symmetry Experiment)

Measures the magnetic moment
of the antiproton

g factor

proton 5.5856946893

antiproton 5.5856946906

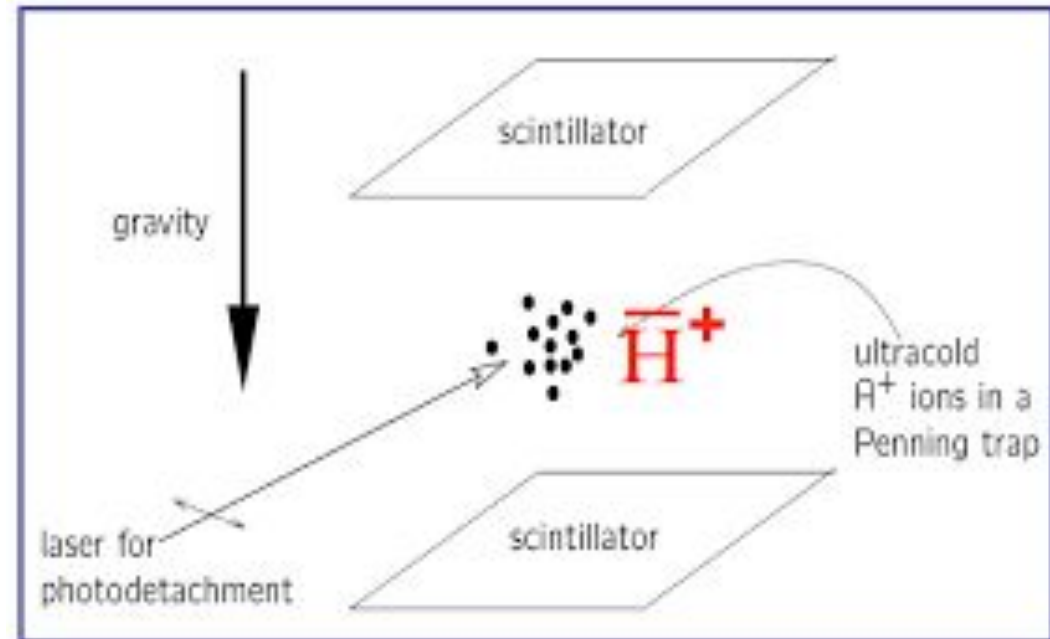


GBAR

(Gravitational Behavior of Antimatter at Rest)

Measures freefall acceleration g of antihydrogen ions with two positrons.

Ions are cooled to micro-Kelvin temperatures.







CERN

Lake Geneva

GENEVA

Annemasse

Saint-Julien-en-Genevois

Valsertône

Bonneville

La Roche-sur-Foron

Annecy