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EicC

pRing ~ 1149.07 m

eRing ~ 1151.20 m

AR ~ 287.80 m

eGun

eLinac

BRing-N ~ 569.10 m

BRing-S ~ 574.54 m

iLinac

SP

HIAF and HIAF-U

- Intensity: $H^+/D^+ > 1$ mA
 - Polarization: $> 80\%$
 - Repetition: 2-5 Hz
 - Pulse Width: 100 μ s
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- The diagram illustrates the experimental setup for the production and detection of H^+ ions. The setup is a complex arrangement of various components, including a Polarized Atom Beam Source, Dipole Magnet, Plasma Ionizer, Plasma Source, Storage Cell, Diagnosis Chamber, WFT, SFT, Einzel lens, Wien Filter, Deceleration lens, Sodium oven, Spin filter, Metastable atom detection, and Lamb-shift spin filter Polarimeter. The components are arranged in a linear fashion, with the beam path indicated by a red arrow. The setup is designed to produce a polarized atom beam, which is then ionized and detected using a series of filters and lenses.

$H^0 \uparrow + D^+ \rightarrow H^+ \uparrow + D^0$ ($\sigma \approx 5 \times 10^{-15} \text{ cm}^2$ @ $E_{D^+} \sim 10 \text{ eV}$)

$H^0 \uparrow$

$H^+ \uparrow$

Dipole

Storage Cell

Beam Extraction

Solenoid

Plasma Generator

HV 25 kV

Gas Inj. 37.3 mbar-L-S⁻¹, 500 us

U_{A_ground} 25 kV, 500 us

I_{A_ground} 500 mA, 150 us

U_{BC} 6 kV

U_{AB} 300 V, 80 V

I_{AB} 300 A, 150 us

t_0 t_1 t_2 t_3

Cooling Water

Solenoid Valve Ignition elec. (C)

Cathode (B)

Washer

Anode (A)

Coil

Arc Voltage 80 V

Arc Current 270 A

Pulsed HV 20 kV

Unpolarized H⁺ beam 4.6 mA

Dissociator **Sextupole Magnets** **Sextupole Magnets**

Skimmer

Nozzle
30-80 K

Medium Field Transition (MFT)
D 1↔4, D 3↔4

SFT
H 2↔4
D 2↔6, D 3↔5

WFT
H 1↔3
D 1↔4

Dipole Magnet
Gradient Coil
RF Coil

Amplitude Square vs. **Position (mm)** and **Time (μs)**