H1 Status

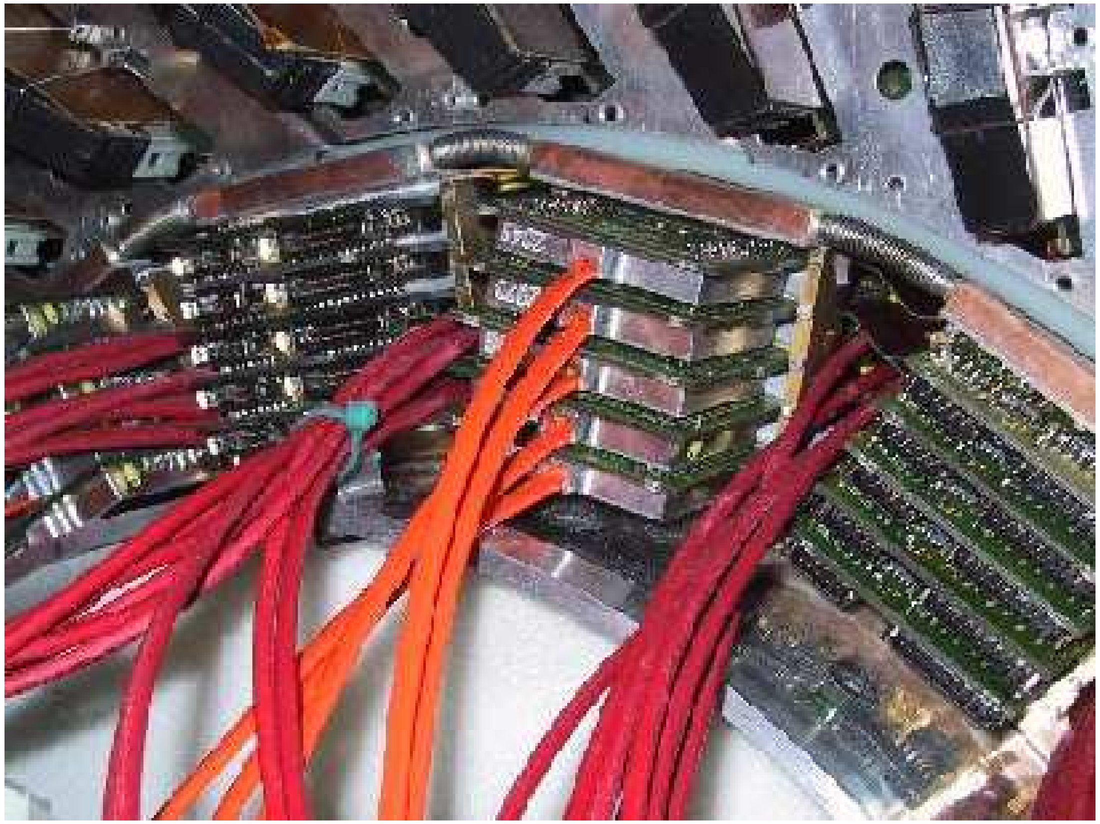
Daniel Pitzl, DESY

HERA coordination meeting, 1.7.2003

- H1 shutdown
- New components
- Restart plans and requests

Central Inner Proportional chamber

CIP frontend electronics:



- Heat damaged frontend cards exchanged (20 of 40). Optical links re-used.
- Second cooling water ring and heat shield to CJC preamps installed.
- Max T now 36^{o}C with all 5 layers powered.
- 40 individual control cables instead of 5 daisy-chains.
- Expect fully effective CIP z-vertex trigger.

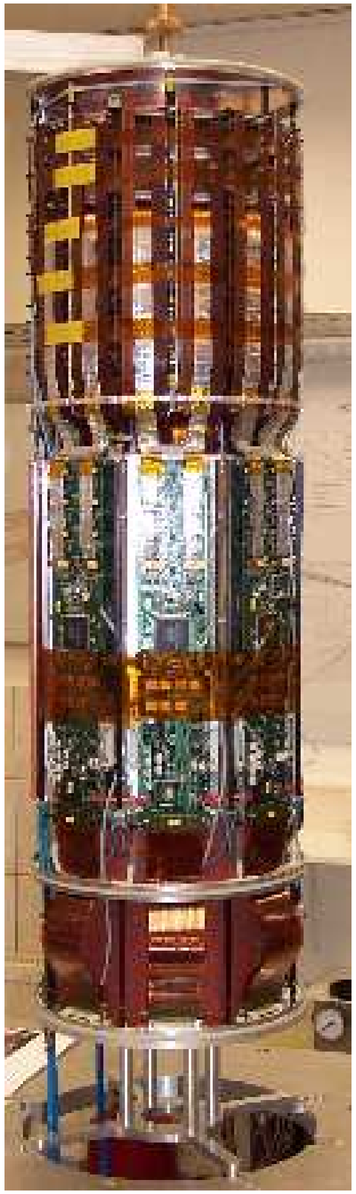
Central Silicon Tracker

CST installation with raised GG magnet:

Raphael Baldinger and Benno List

- Exported for repair to PSI.
- Remaining 6 (of 32) silicon ladders equipped with radiation hard frontend electronics (DMILL-APCs).
- 64 radiation damaged voltage regulators at $z = -1.35\,\mathrm{m}$ exchanged.
- Cooling water flow improved with wider internal supply tubes.

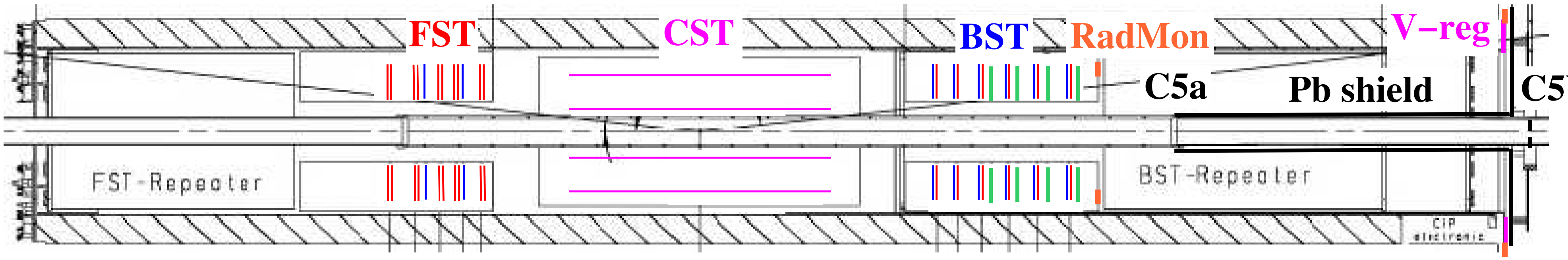
Backward Silicon Tracker



- Transported to Zeuthen.
- 72 old R-sensors replaced by φ-sensors (planned).
- 30 radiation damaged sensors replaced (not planned).
- 11 of 12 planes equipped.
- New repeater electronics for Pad detector and trigger.
- Clock receiver and distributors replaced by commercial radiation resistant versions.
- BST fully operational.

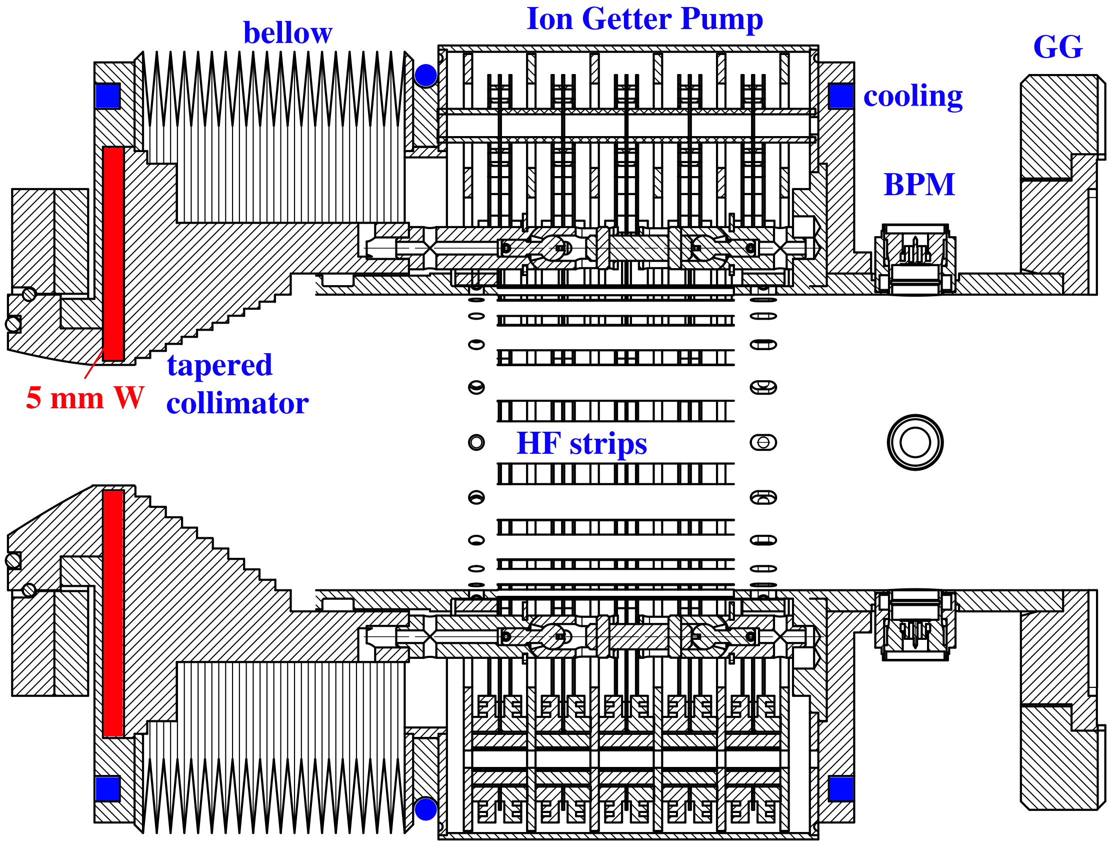
Radiation protection

- Severe radiation damage in Silicon Tracker electronics at NR 1.3 m.
- Dosimeters show 10–30 kGy.
- Possible source: direct SynRad on C5b at injection or missteering at 27.6 GeV. C5b upper edge blackened.
- Central and forward Silicon OK, dose 0.03–0.1 kGy.
- 2 mm Pb shield around beam pipe between C5a and C5b.
- Shields CST voltage regulators and BST repeater.
- CJC SynRad rate reduced by factor 4 (simulation).
- New radiation monitors: Peltier-cooled Si diodes with threshold-free current integration and charge-to-frequency conversion.



New C5b collimator with integrated ion getter pump

At NR 1.45 m:



- 5 mm tungsten plate outside of stainless steel beam pipe.
- Add taper to reduce higher order mode heating by 15–30%
- Add water cooling to reduce temperature peaks at injection.
- Add an integrated ion getter pump with 400 ℓ/s.
  Reduces p-gas induced CJC current by 1/3.
- After assembly: 4 day bakeout at 148^{o}C.
- Pump tested OK in 1.16 T field.

VFPS

At NR 220 m:

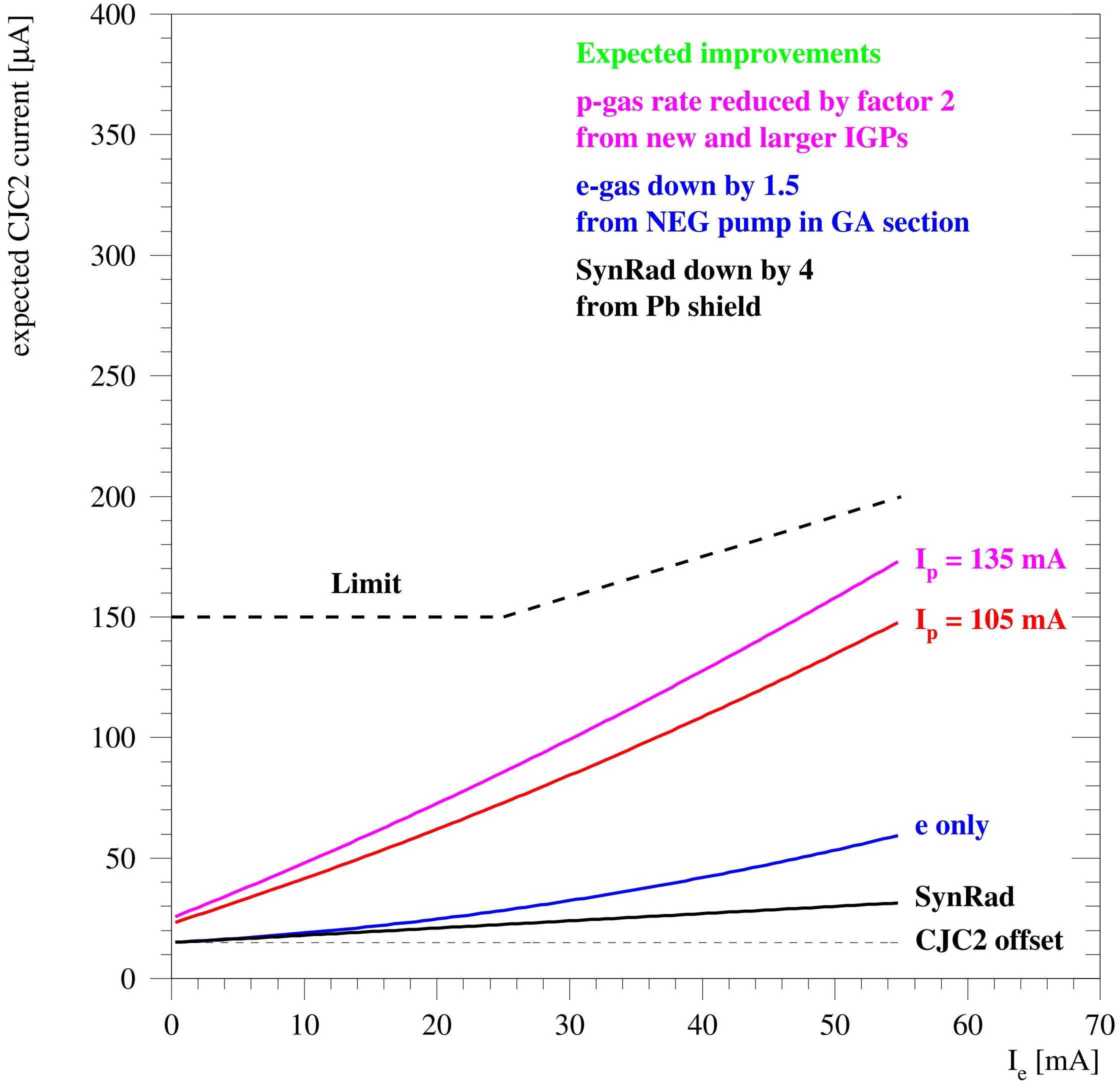
- Helium bypass built within 6 months at DeMaCo, NL. Cold tested at DESY.
- Inserted via Hall North (↘ HERA-B)
- Good collaboration with Kryo-, Vacuum-, Survey-, and Installation groups.
- 2 Roman pots with precision fiber detectors.
- Scintillators for trigger and rates.
- Commission with beam in September.

New IGPs and RGAs

At ABS1 (NR 3.6 m) between GG and GI1:

- Pumping conductance at ABS 1 and 2 (-3.6 and -6.0 m) increased by cutting out every 2nd RF grid bar.
- Getter pumps at -3.6 and -6.0 m: replaced 75 ℓ/s by 150 ℓ/s pumps.
- Rest gas analyzers at -3.6 and -6.0 m installed, for in-beam diagnostics.
- RGAs work well, spectrum shows H_2, H_2O, CO, CO_2. Pressure agrees with IGP.

Expected chamber current



Assumptions:

- Factor 2 lower pressure from new IGP, larger IGPs at NR3.6 and NR6.0, and long-term trend.
- Reduce e-gas rate by 1.5 with new NEG pump in GA section.
- Reduce SynRad by 4 with Pb shield.
- This should allow safe operation at $55 \cdot 105$ mA^2 if no (quadratic) surprises appear beyond I_e of 30 mA.

Startup

Preparations:

- 2 weeks cosmics run from 4.7.
- During bake out:
  - Close collimators as far as possible.
  - Temperature and radiation monitoring.
  - IP pressure monitoring with lumi detector.
  - Rest gas analysis.
- On-line lumi measurement will be available.
- CJC available with proper gas in mid Sep.

e^+p operation:

- Start when backgrounds allow to reach 2000 peak lumi, e.g. $35 \times 15\,\mathrm{mA}^2$ in 60 bunches.
- Increase number of bunches as backgrounds allow.
- e^+ polarization from the start.
- Start with right-handed e^+ ($\vec{S} \parallel \vec{v}$) to enhance charged current cross section.
- One flip of polarization before Christmas, roughly half-way in integrated lumi.