HERA Operation 2004

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PRC, Mai 2004

- Performance Improvements in 2004
- Remaining Problems
- Improvement Program
- Schedule 2004

Performance Improvements in 2004

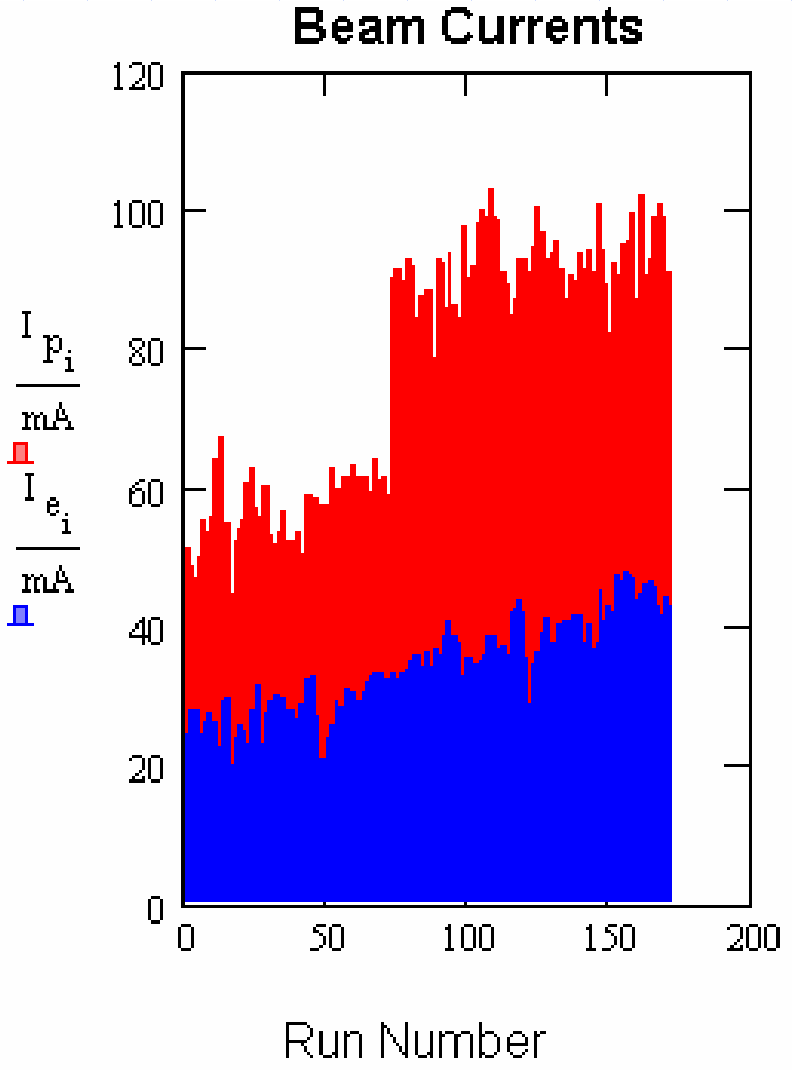
Beam Currents

Until March the Proton Beam Current was limited due to Radiation Safety Issues.

Best Values until now:

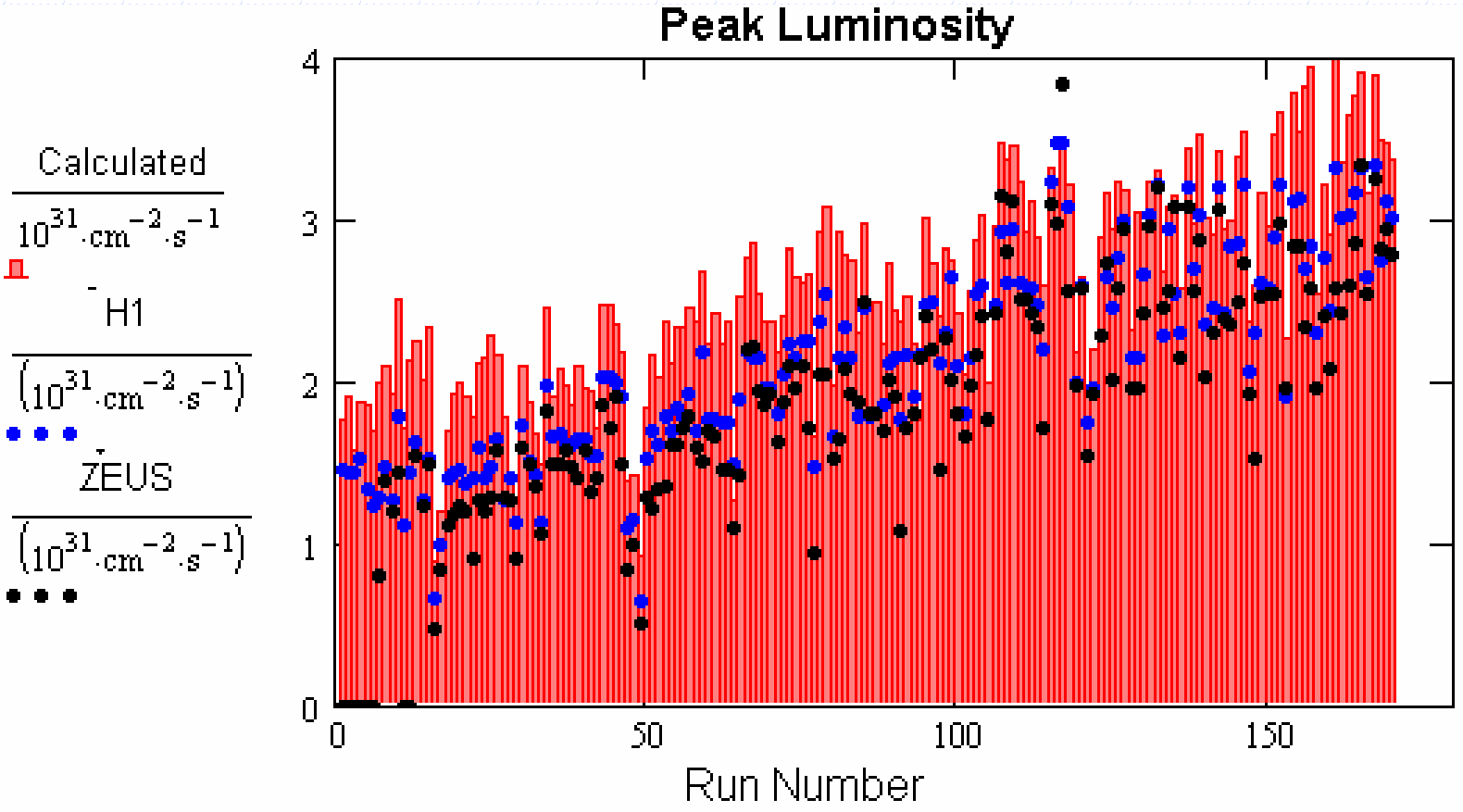
103 mA Protons @ 920 GeV,

47 mA Positrons @ 27.5 GeV.



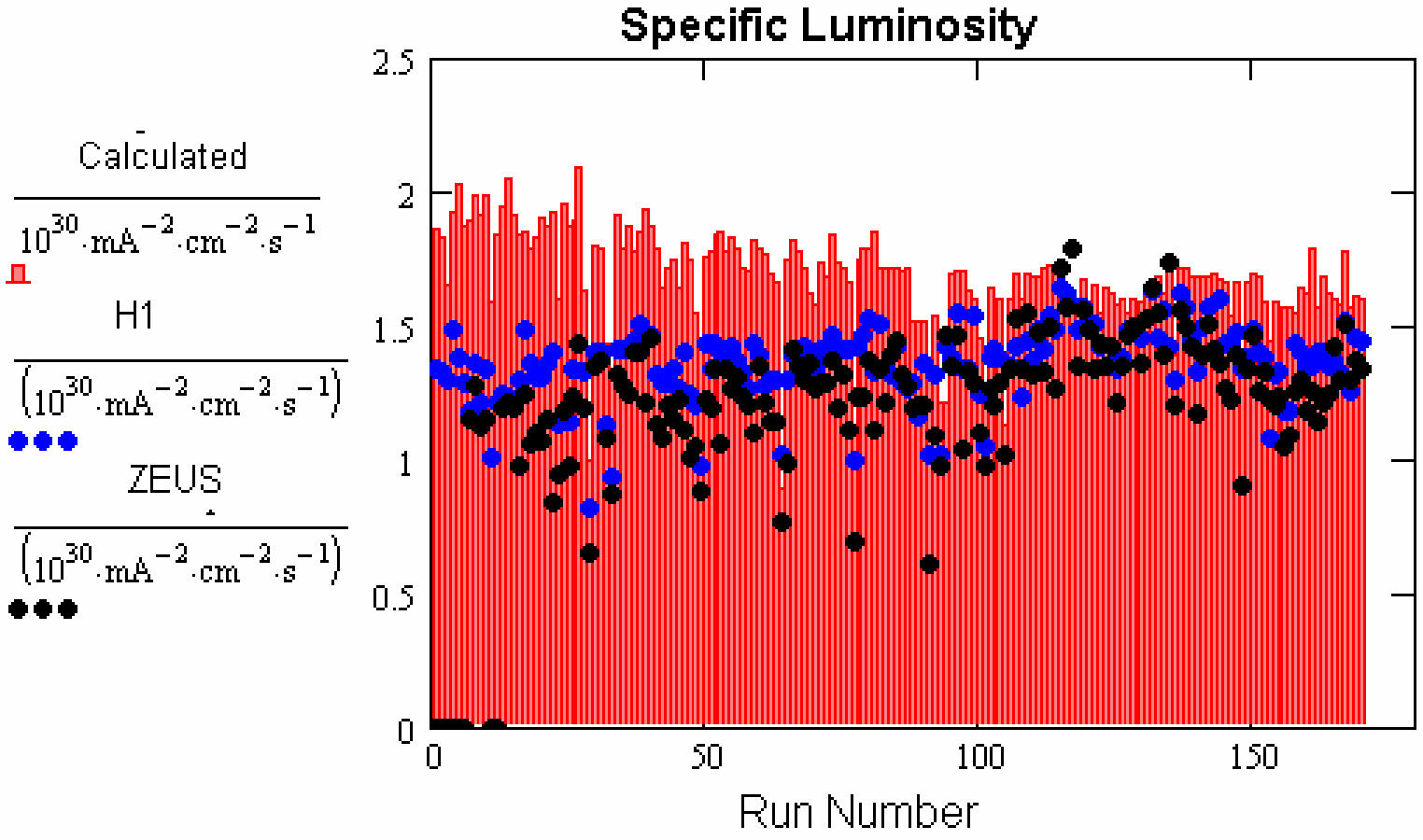
Performance Improvements in 2004

Peak Luminosity has increased to 3.5 10^{31}



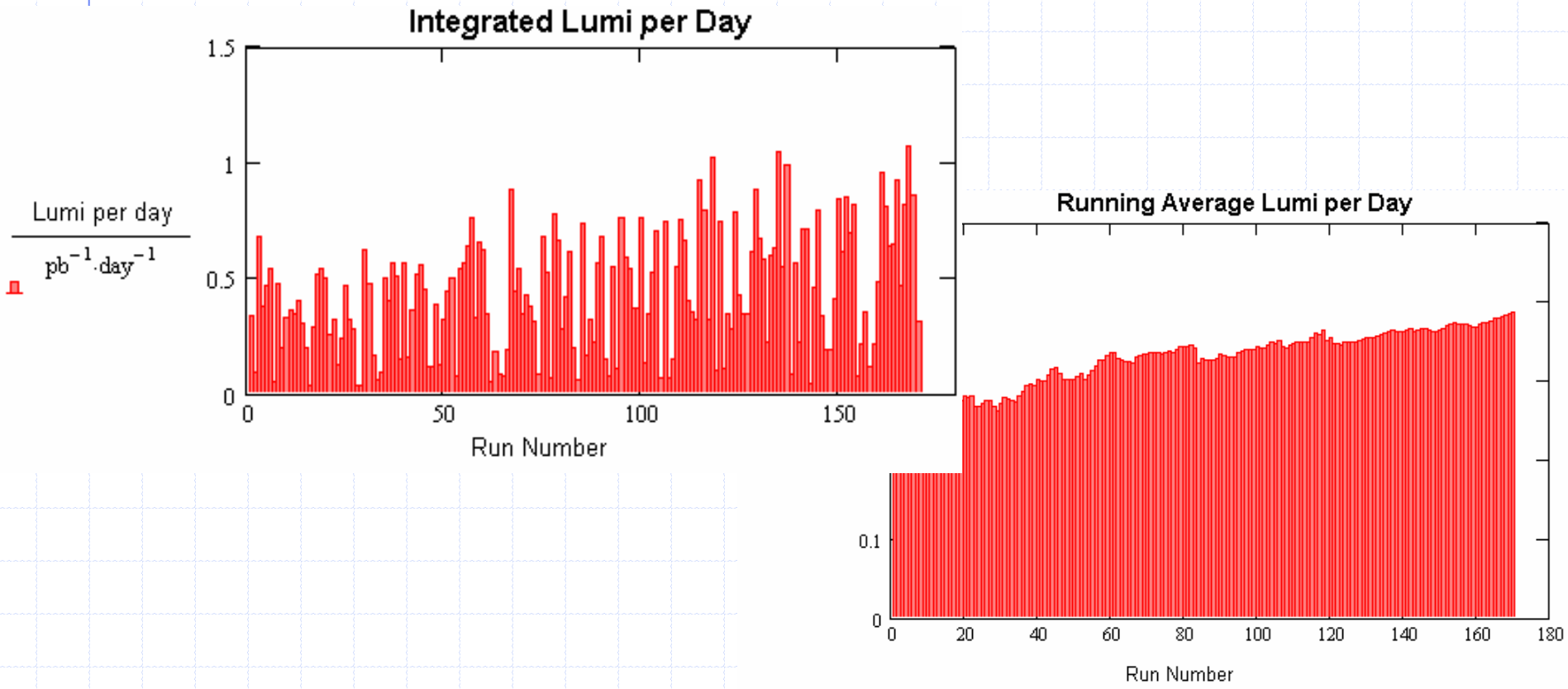
Performance Improvements in 2004

$L_{sp} \approx 1.6\ 10^{30} \approx 90\%$ design



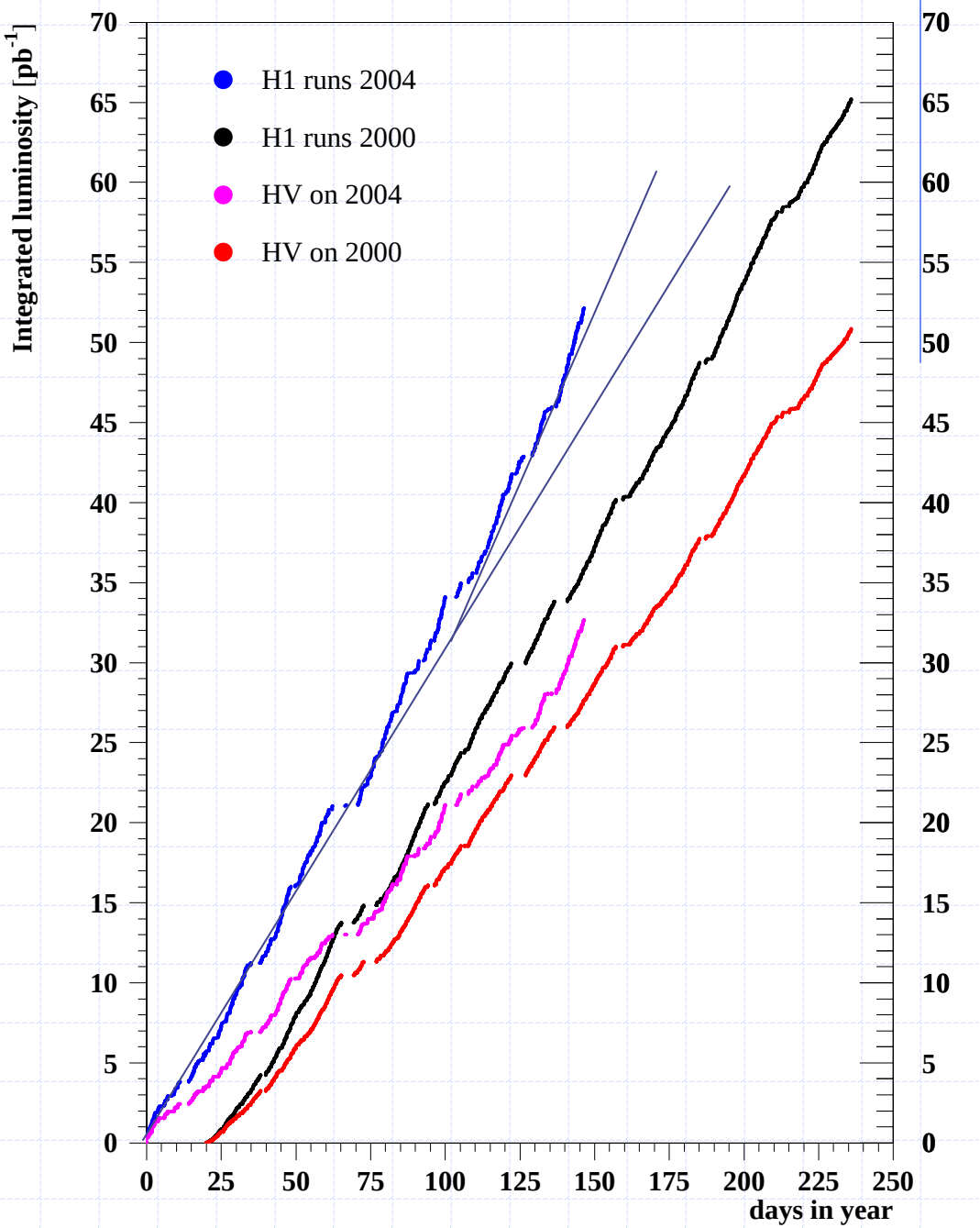
Performance Improvements in 2004

- Peak Lumi per Day: 1 pb^{-1}
- Peak Lumi per Week: 5pb^{-1}



Integrated Lumi 2000 and 2004

Since January 2004 the Lumi Production Rate is comparable with 2000, since April 2004 it is considerably better.



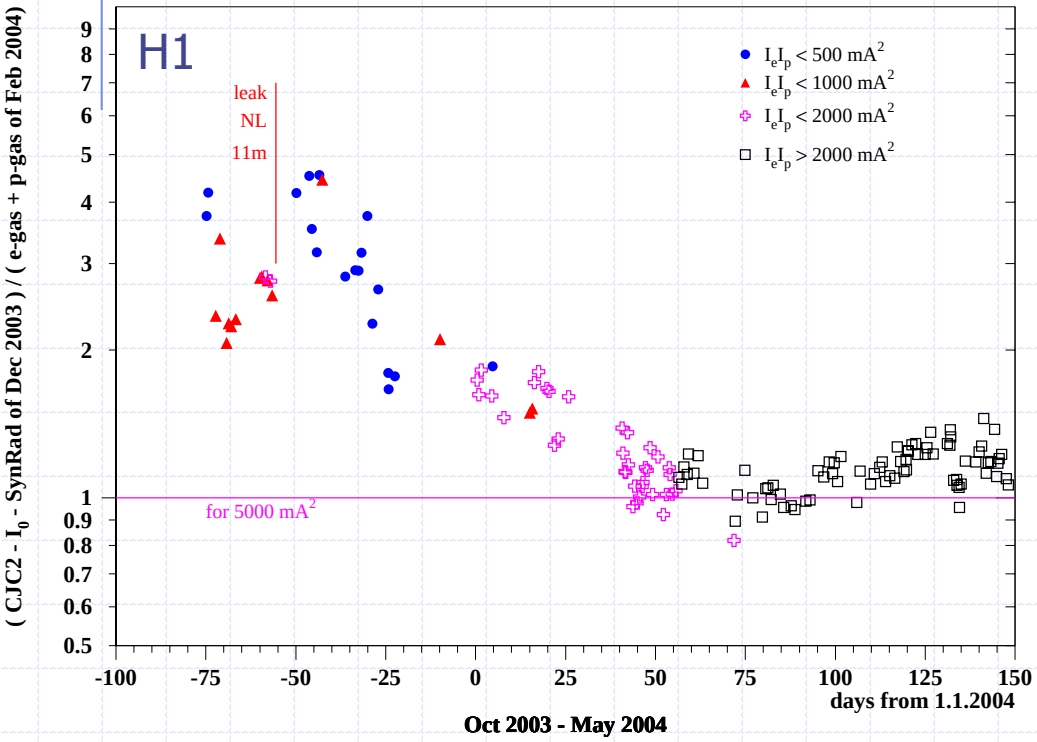
Performance Improvements in 2004

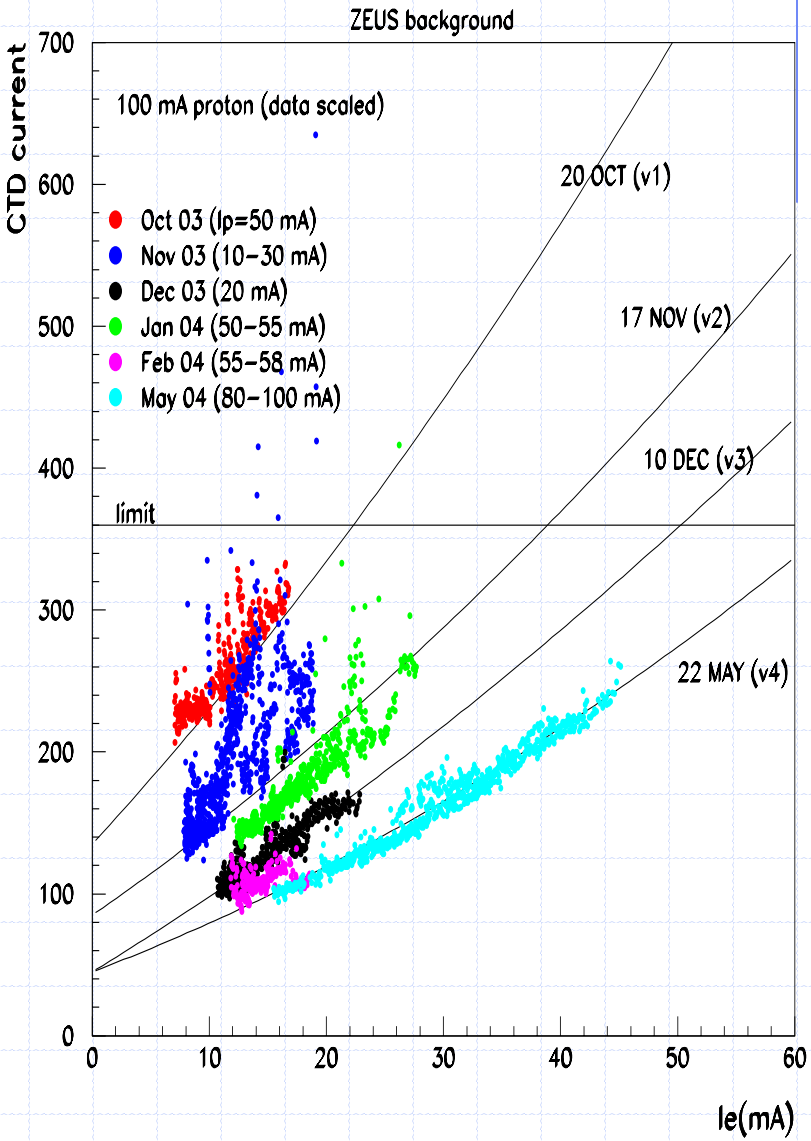
Measures to improve HERA Performance:

- Streamlined Procedures (Positron Ramp directly into the Lumi File, ZEUS Calorimeter Closing @ 12 GeV,…) allow use of high Positron Currents.
- Collision first at H1, then at ZEUS (to avoid Beam blow up).
- Correction of Beam Tilts individually in ZEUS and H1.
- Phase Trombone (Adjustment of Betatron Phase Advance in both ZEUS and H1 to compensate Beam-Beam Effects).

Performance Improvements in 2004

Background Rates at ZEUS and H1 have decreased to tolerable Values.

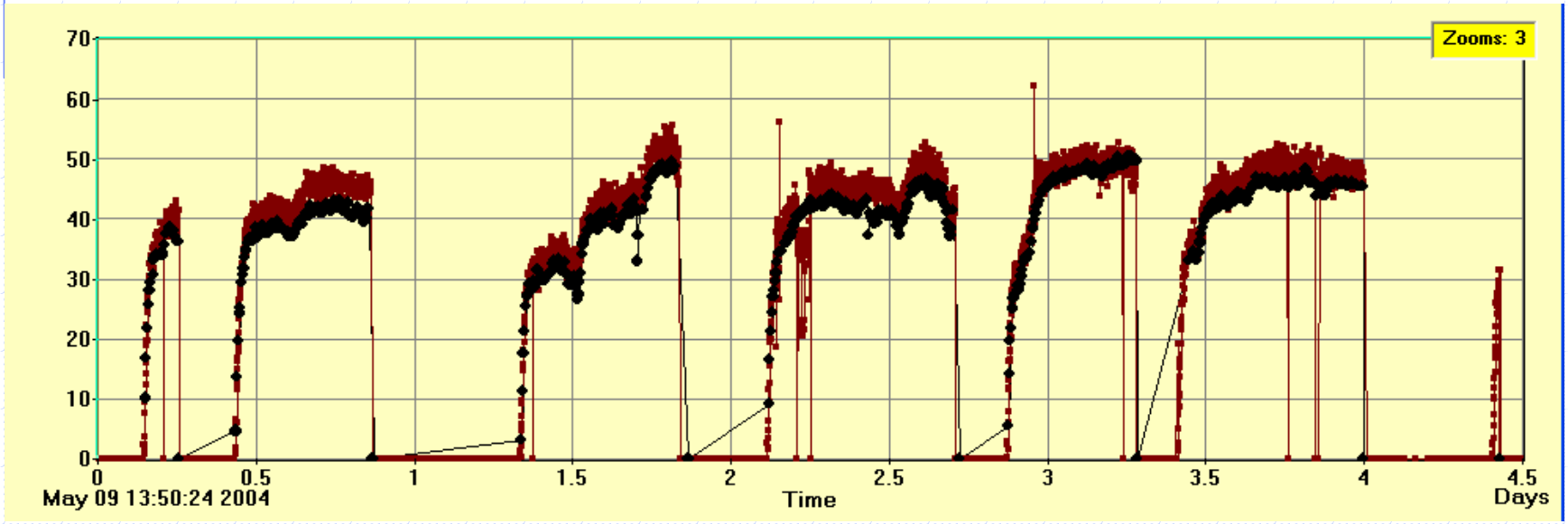




Performance Improvements in 2004

Polarisation reaches 40% regularly with 3 Spin Rotators on and Collisions. During long, quiet runs Polarisation can be tuned up to 50%.

A faster Polarimeter would be useful for faster Tuning.



Remaining Problems

Now that the Luminosity Goals are within Reach and the Background Problems are solved, the main Problems are

- Reliability and Availability of all Components
  (some Components are as old as PETRA)

- Efficiency of Operation
  (Experienced Operators have retired, new Operators have Tasks on new Projects and no Connection to HERA)

Remaining Problems

Measures to improve Efficiency of Operation:

- Enhanced Operator training
- Improved Communication (Shift Briefings)
- More Software Support for Operations
- Continue daily Operations Meeting with all Groups

Remaining Problems

Critical Systems in Terms of Support, Expertise or Manpower:

- Quench Protection
- Proton RF Systems
- Warm Magnets
- PETRA
- Timing and Low Level RF

Improvement Program:

Rich Program with 70 Items, the most important ones being:

- Proton RF Systems	Improved low-level Controls, Suppression of long. Instability
- Injection Systems	Improved monitoring, vertical Excitation Kicker
- Collimation Systems	Increased Reliability
- Diagnostics Systems	Improved Monitors (BPM, SR)
- RF-Controls	p-RF Freq. Control, etc
- Vacuum System	Better Pumping in RF Sections
- Power Supply Systems	Add'l PS for Spin Matching
- e-RF Systems	RF Modulator Upgrade
- Cryogenic Systems	Compressor and Controls Upgr.

Sum: 2.26 M€