HERA Experiment Meeting, May 24th, 2005

First Results using Mirror-Tunes

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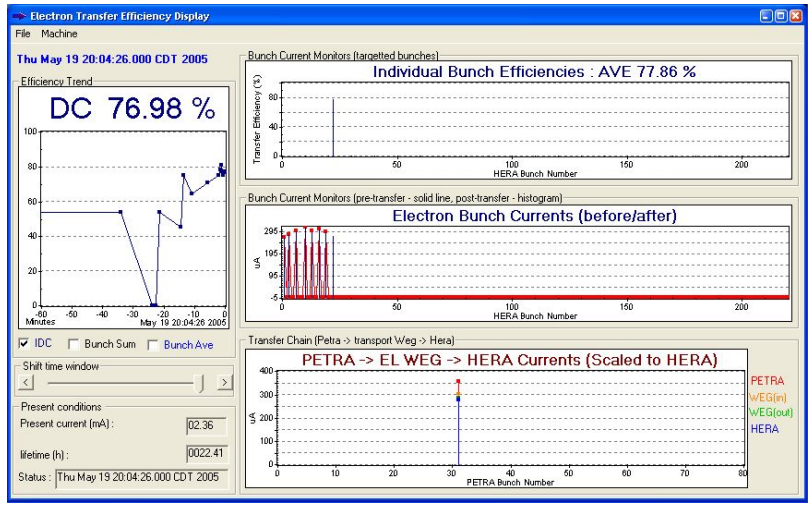
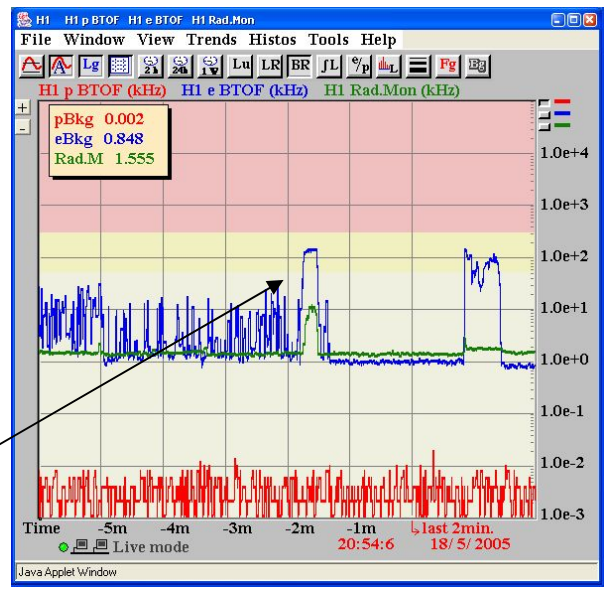
Set up of Files

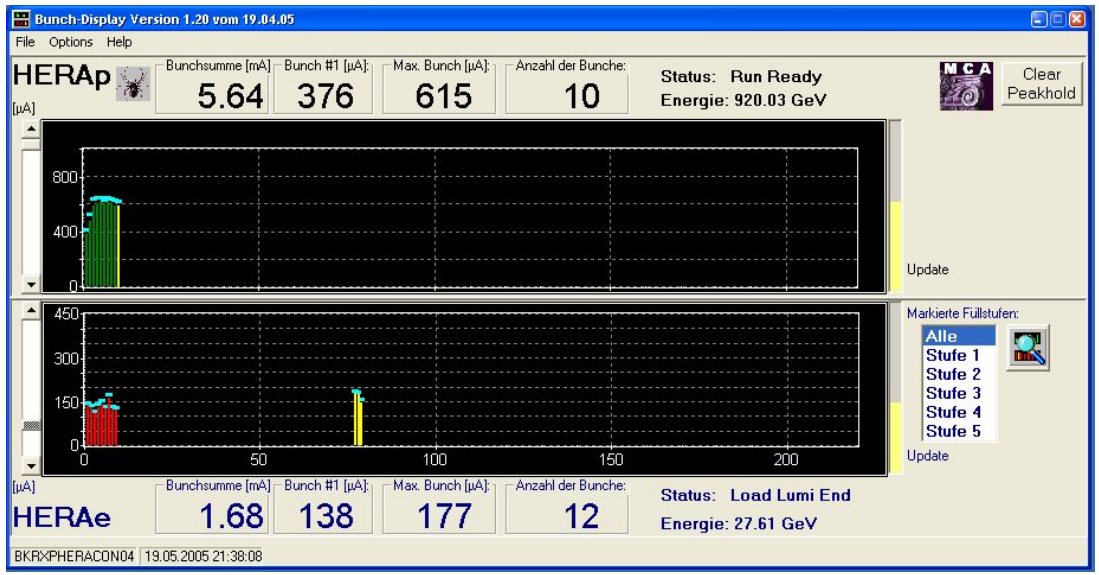
- Started with mirror tunes at 19.5.05 late shift
- Rotators N,S,E were flipped
- Injection efficiency good; 77%!
- Set up of tune controller for mirror tunes took some more time then expected
- Ramp cumbersome, but working
- Problems at 19 GeV with H1 electron background
- Compensation by H4A bumps
  ⇨ 3rd synch. satellite stronger?





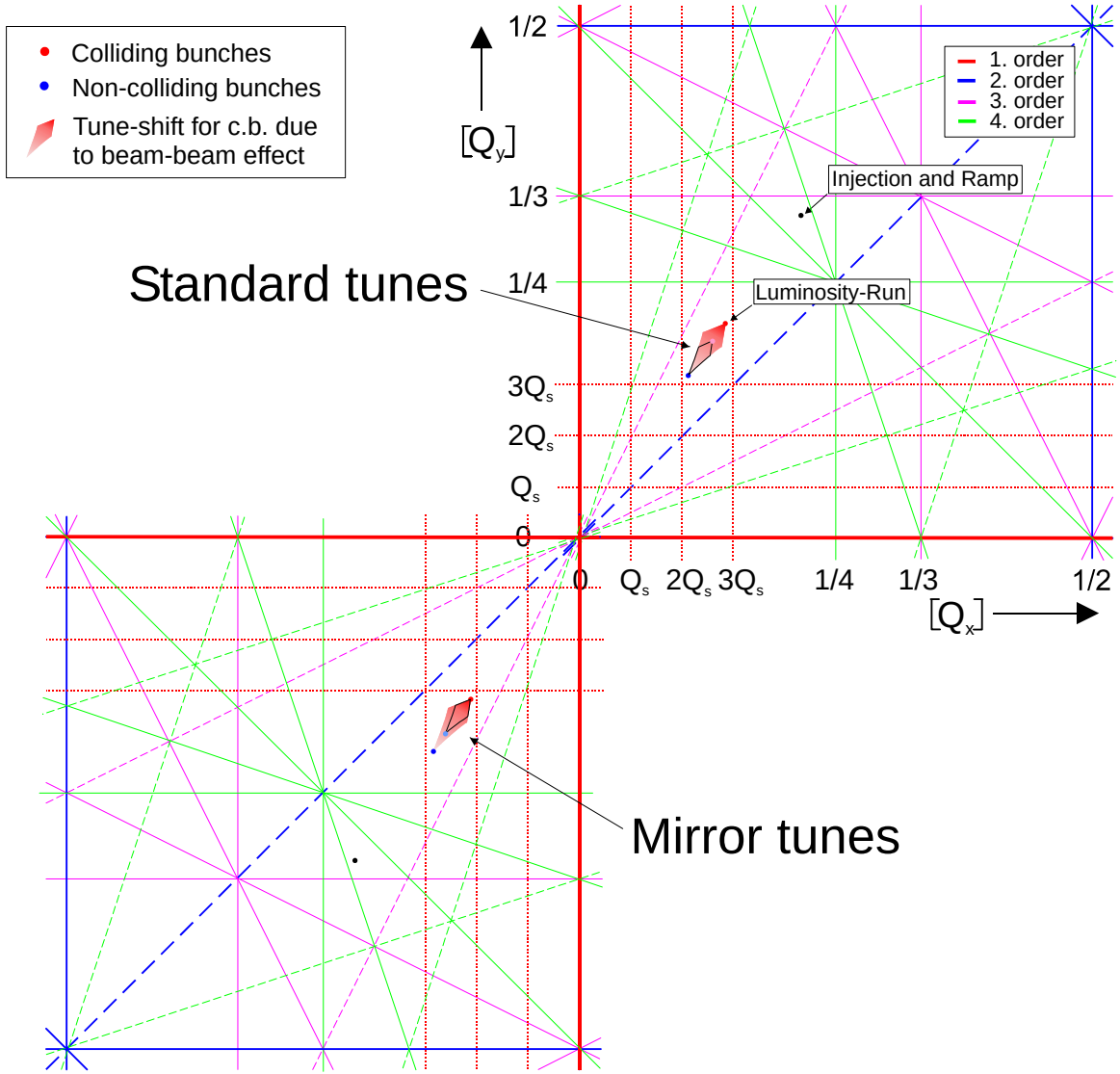
Crossing 3rd order synchrotron satellite with Qx change

Mirror Tune Experiment

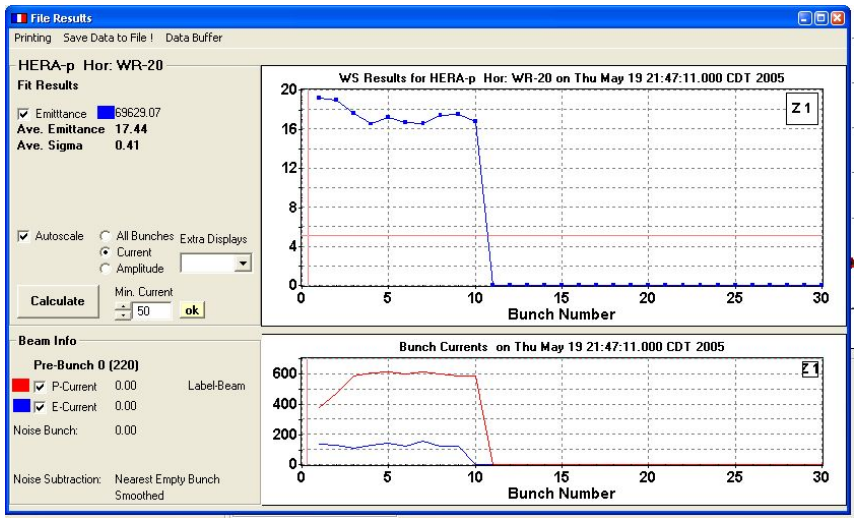


- Only one luminosity test run so far: 19.5.05, late-/night shift
- Limited time due to warm up of GO/GG in north
- Bunch pattern:
  - Electrons: 12 bunches (2 pilot bunches)
  - Protons : 10 bunches (1 pilot bunch)
  - 9 colliding bunches
- Bunch currents:
  - Electrons: I = 1.7 mA
  - Protons: I = 5.7 mA

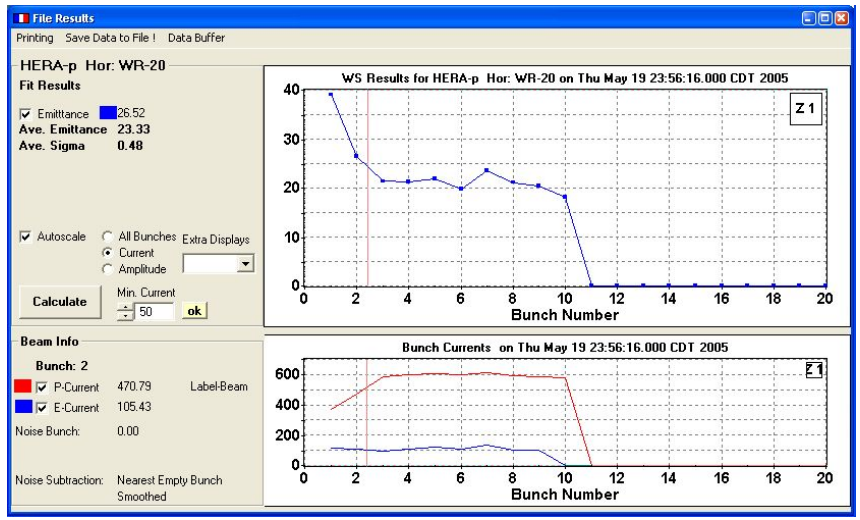
Resonance Diagram for e^--Operation



Proton Emittance



Collisions at H1 & ZEUS, 9:47 p.m.



Collisions at H1 & ZEUS, 11:56 p.m.

- Normalized proton emittances ok with 17 mm*rad at beginning of test run
- Later there was an emittance increase of the first bunches
  ⇨ smaller luminosity

Specific Luminosity with Mirror Tunes

Maximum specific luminosities achieved with mirror tunes:

L_s(ZEUS) = 1.63×10^{30} mA^{-2} $cm^{-2}s^{-2}$

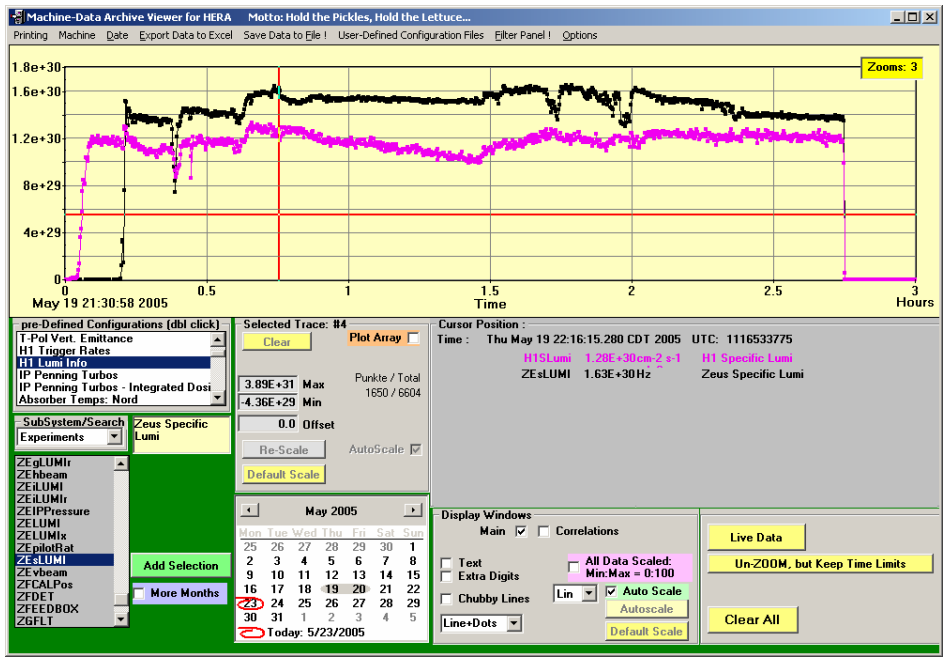
L_s(H1) = 1.31×10^{30} mA^{-2} $cm^{-2}s^{-2}$

Horizontal phase trombone was useful to optimize specific luminosity

Why is specific luminosity so low for these tunes?

1. Only one run until now, luminosity not really optimized yet
Difference in L_s between H1 and ZEUS!

2. Smaller specific luminosity for the mirror tunes; beam-beam-tune shift and resonance structure is similar to positron situation



⇨ Mirror tune experiment not conclusive so far!