HERA Medium –Term Planning

Machine Developement

Background Studies

Luminosity Operation

Beam Scrubbing

Optimum Collision Parameters

Maximum Product IexIp $I := \sqrt{20mA \cdot 30mA}$

Maximum Proton Current per Bunch $I_{pb} := 100 \cdot mA \cdot 180^{-1}$

Maximum Positron Current per Bunch $I_{eb} := 50 \cdot mA \cdot 189^{-1}$

e,p Currents should be distributed over minimum number of Bunches, thus the maximum bunch currents should be reached

$$n_b = I_e \cdot I_{eb}^{-1} \qquad n_b = I_p \cdot I_{pb}^{-1} \qquad I_e \cdot I_p = I^2$$

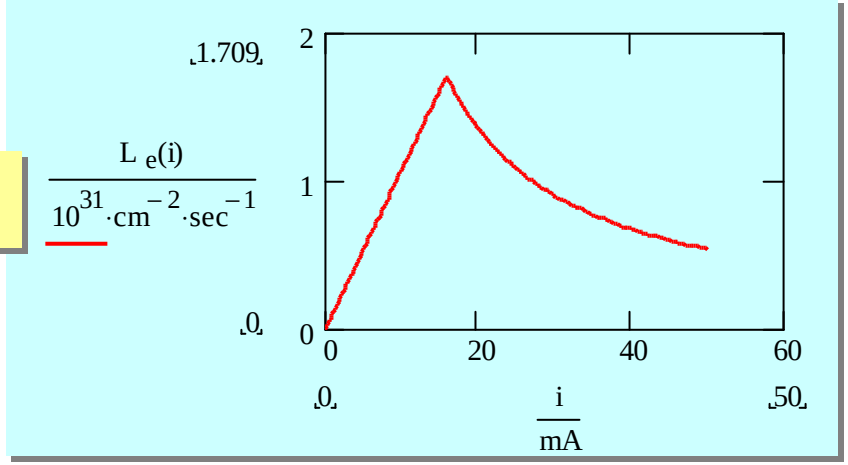
total e Current $I_e := \sqrt{I^2 \cdot \frac{I_{eb}}{I_{pb}}}$ $I_e = 16.903\,mA$

number of bunches $n_b := \frac{I_e}{I_{eb}}$ $n_b = 63.894$

total e Current $I_e := n_b \cdot I_{eb}$ $I_e = 15.873\,mA$

total p_current $I_p := I_{pb} \cdot n_b$ $I_p = 33.333\,mA$

Nb=60



$$L := \frac{I_{pb} \cdot I_{eb} \cdot n_b}{4 \cdot \pi \cdot e^2 \cdot f_r \cdot \varepsilon_p \cdot \sqrt{\beta_{xp} \cdot \beta_{yp}}} \qquad L = 1.712 \times 10^{31}\, s^{-1}\, cm^{-2}$$

Machine Developement Plans & Needs for August-October 02

Beam Optics Tests and Fixes	
Proton ORM	6 shifts
Electron ORM	6 shifts
Polarization Tunes	3 shifts?
Luminosity Studies	
Study of Lspec vs Intensity	9 shifts
Study of Beam-Beam Tails	4 shifts
Study of Beam Tilts	2 shift
Study of Beam Waist	4 shifts
3-dim Lumiscan	4 shifts
High Intensity Study	
Proton Stability at 100mA	3 shifts
Positron Feedback and Stability at 30-50mA	6 shifts
Operational	
Further developement of orbit feedback	4 shifts
High Intensity e-Beam Acceleration	10 shifts
TOTAL	60 shifts = 16 days

Background Studies

- H1 CJC2 vs Ie (e+ only) 0-50mA 6 shifts
- Repeat Energie Scan of e+ Backgrounds 4 shifts
- Repeat „long“ High e+ Intensity Run 2 shifts
- Proton only Vacuum SR Tests 4 shifts
- Placeholder for new Ideas 20 shifts
- Total ~40 shifts

Beam Scrubbing

Need 30 Ah

$< I_e > = 15mA /2$

Efficiency 30%

Fraction of time reserved for Luminosity Run:
3 days per week

➔ 18 weeks or 4 month (November)