

# G<sup>0</sup> PC Installation and Beam Studies

September 2006

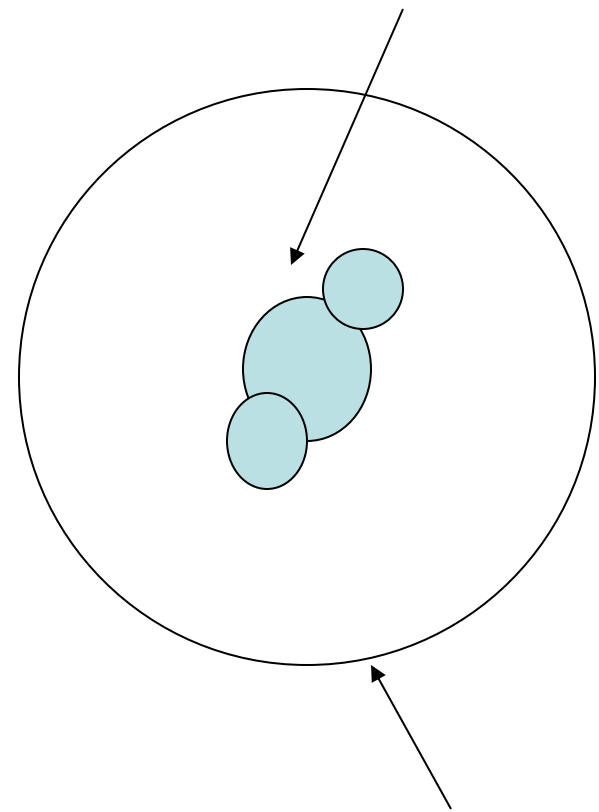
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Riad Suleiman

# Pockels Cell Installation

## September 12, 2006

- Beam spot had two satellites at about  $45^\circ$  and  $225^\circ$
- John and Matt determined the source of the satellites to be the tune cell
- Swapped Hall C and Hall A tune cells
- Satellites disappeared

Laser beam going through the PC is not point-like.



Face of Pockels cell

# Pockels Cell Installation

## September 12, 2006

- What did we accomplish?
  - Characterized Intensity Asymmetry (IA) Cell:  
 $\lambda/4$ ,  $16^\circ$ 
    - Measured dependence of intensity asymmetry on voltage : 22.27 ppm/V
  - Aligned Pockels Cell (PC)
    - Degree of linear polarization = 3.62%
    - Degree of circular polarization = 99.93%
    - Minimized x and y position differences.

# Pockels Cell Installation

## September 12, 2006

| Steering (LP OUT)     | IHWP IN                        | IHWP OUT                       | Goal                |
|-----------------------|--------------------------------|--------------------------------|---------------------|
| $\Delta x$            | $0.0023 \pm 0.032 \mu\text{m}$ | $-0.064 \pm 0.023 \mu\text{m}$ | $< 0.1 \mu\text{m}$ |
| $\Delta y$            | $0.24 \pm 0.030 \mu\text{m}$   | $-0.24 \pm 0.020 \mu\text{m}$  | $< 0.1 \mu\text{m}$ |
| $\Delta\text{charge}$ | $6.35 \pm 3.41 \text{ ppm}$    | $-8.13 \pm 3.72 \text{ ppm}$   |                     |

| Birefringence (LP IN) | IHWP IN                        | IHWP OUT                     | Goal              |
|-----------------------|--------------------------------|------------------------------|-------------------|
| $\Delta x$            | $-11.04 \pm 0.021 \mu\text{m}$ | $8.22 \pm 0.016 \mu\text{m}$ | $< 6 \mu\text{m}$ |
| $\Delta y$            | $1.868 \pm 0.013 \mu\text{m}$  | $2.06 \pm 0.013 \mu\text{m}$ | $< 6 \mu\text{m}$ |
| $\Delta\text{charge}$ | $-2169 \pm 89 \text{ ppm}$     | $3601 \pm 86 \text{ ppm}$    |                   |

| Electrical Pickup     | PC OFF                               |
|-----------------------|--------------------------------------|
| $\Delta x$            | $-0.003636 \pm 0.004735 \mu\text{m}$ |
| $\Delta y$            | $-0.001241 \pm 0.003138 \mu\text{m}$ |
| $\Delta\text{charge}$ | $0.9439 \pm 0.9773 \text{ ppm}$      |

w/ photocathode  
3X larger in  
injector

w/ photocathode  
20X smaller in  
injector

| Injector              | Happex              |
|-----------------------|---------------------|
| $\Delta x$            | $< 0.3 \mu\text{m}$ |
| $\Delta y$            | $< 0.3 \mu\text{m}$ |
| $\Delta\text{charge}$ |                     |

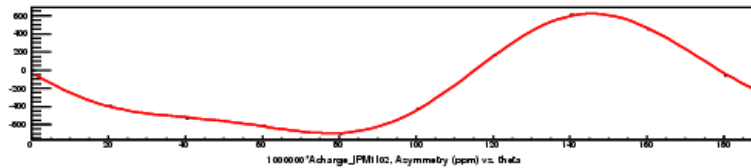
# Electron Beam Studies

## September 14, 2006

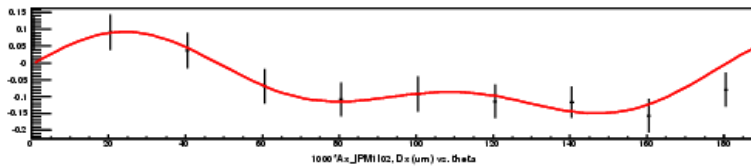
PITA=0

PITA=-180

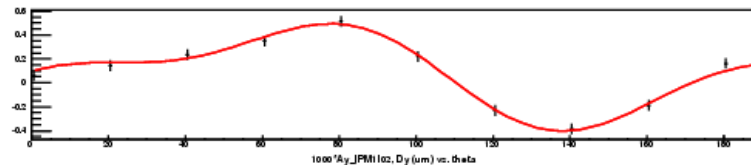
RHWP scan, Run 30905, IHWP OUT, IPM1102



$$A_q = -164.97 + 611.64 \sin(2x + 150.86) + -184.62 \sin(4x + 60.59)$$

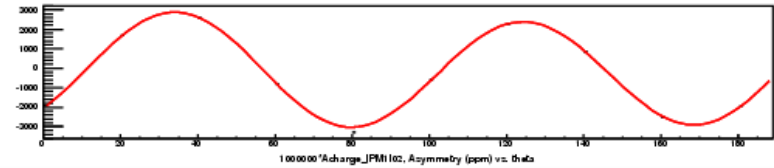


$$D_x = -0.06 + 0.09 \sin(2x + 33.15) + 0.06 \sin(4x + 0.41)$$

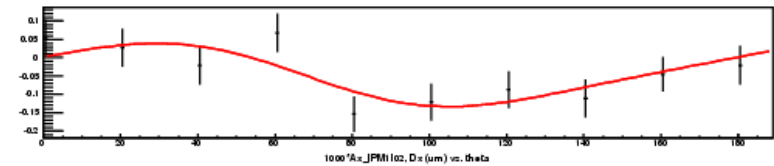


$$D_y = 0.09 + -0.35 \sin(2x + 153.23) + 0.17 \sin(4x + 99.27)$$

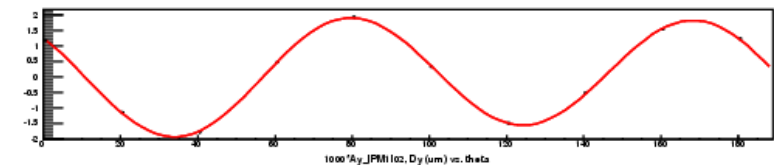
RHWP scan, Run 30906, IHWP OUT, IPM1102



$$A_q = -162.42 + 251.87 \sin(2x + 36.34) + -2796.86 \sin(4x + 133.36)$$



$$D_x = -0.05 + 0.08 \sin(2x + 46.07) + -0.01 \sin(4x + 87.01)$$



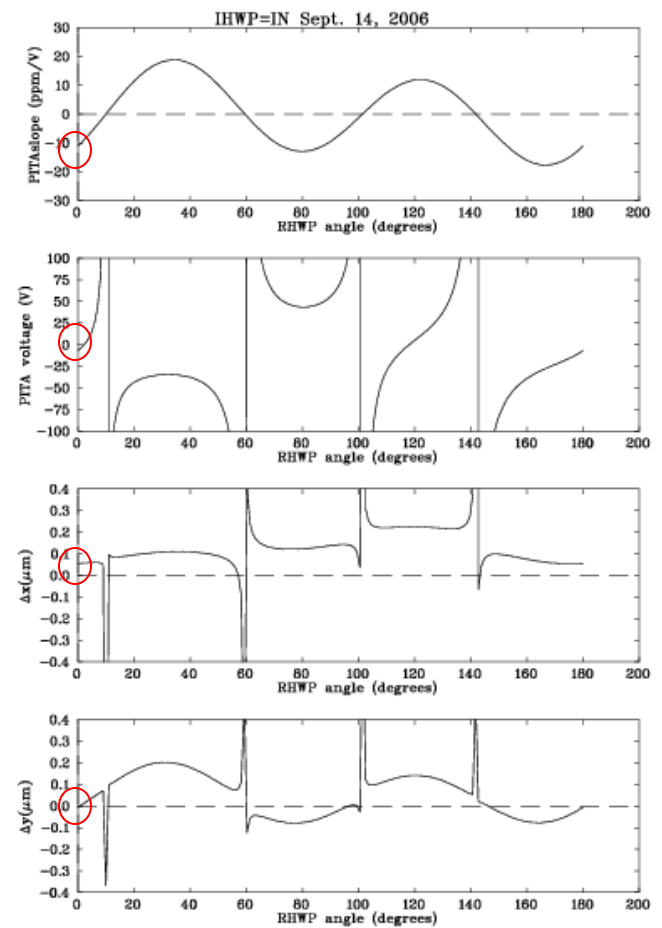
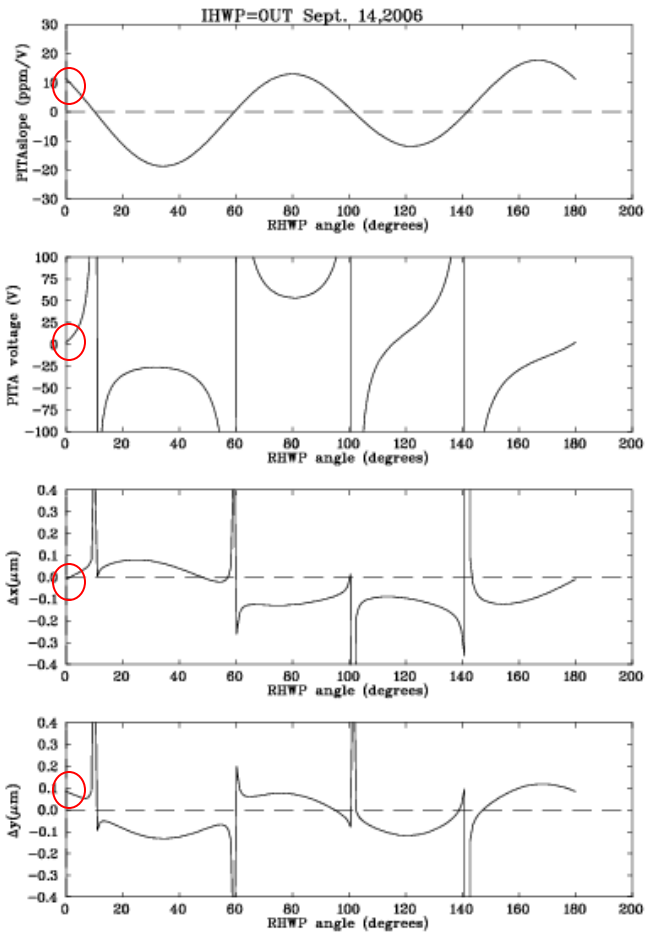
$$D_y = 0.05 + -0.19 \sin(2x + 34.02) + 1.81 \sin(4x + 133.77)$$

# Electron Beam Studies

## September 14, 2006

RHWP=0°

RHWP=0°



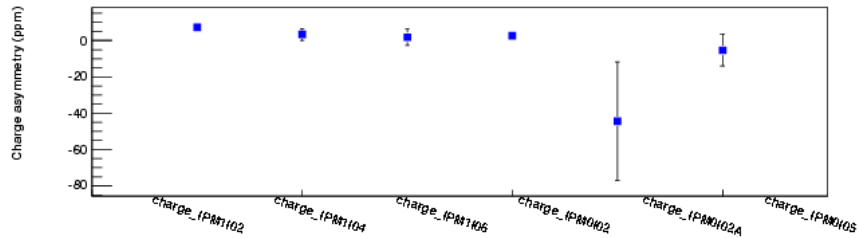
# Electron Beam Studies

## July 18, 2006

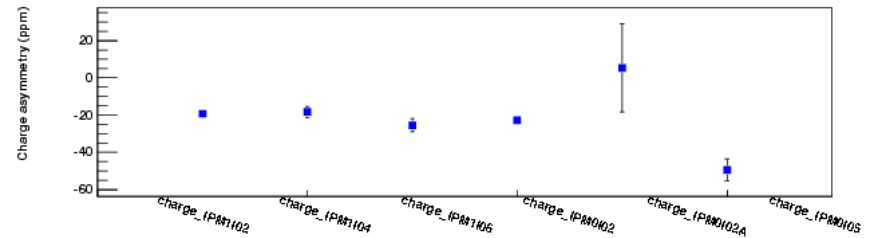
IHWP = OUT  
 RHWP = 0°  
 -10 ppm/V

IHWP = IN  
 RHWP = 0°  
 -11 ppm/V

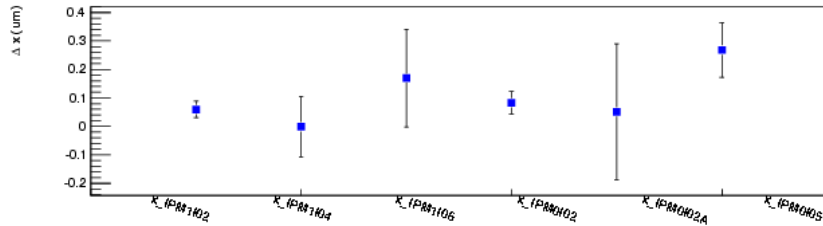
Transmission of Charge Asymmetry, Run 30909



Transmission of Charge Asymmetry, Run 30912



Transmission of X and Y Position Differences, Run 30909



Transmission of X and Y Position Differences, Run 30912

