

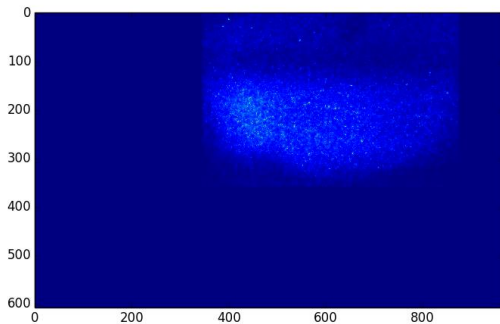


LHC BIF test setup - update

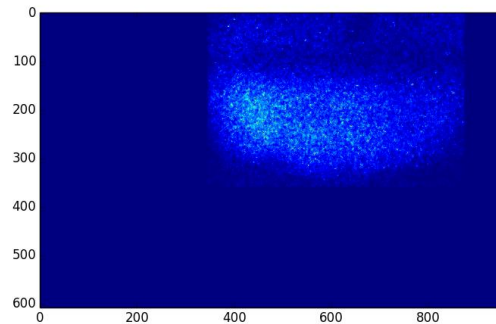
S. Mazzone, 13/12/2018

Data from Pb+ at injection

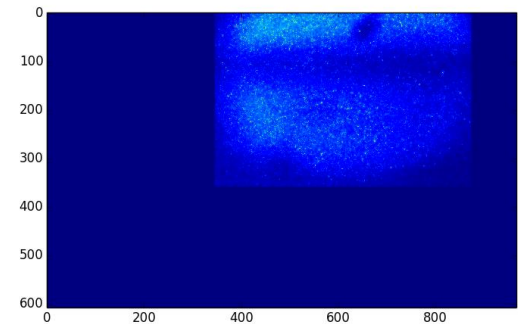
- Fill 7481, 28/11/2018. Acquired data at injection:
 - with / without gas and block filter, beam on
 - with / without gas and 585 nm filter, beam on
- Fill 7487, 30/11/2018. Acquired data at injection:
 - With gas, no beam, 585 nm filter
 - With gas, with beam, 585 nm filter



585 nm, gas **ON**, beam **OFF**
“photon counting” over 577.6 s
(1440 frames, 400 ms exp time)



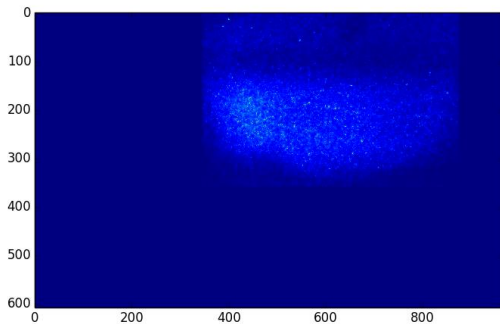
585 nm, gas **OFF**, beam **ON**
“photon counting” over 210.8 s
(527 frames, 400 ms exp time)



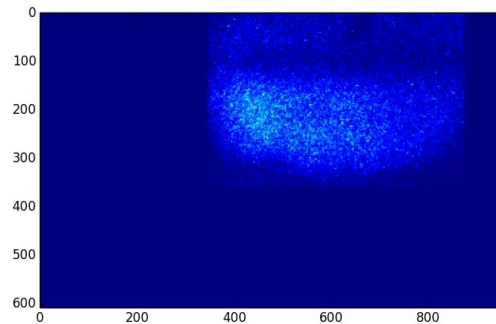
585 nm, gas **ON**, beam **ON**
“photon counting” over 1286.4 s
(3216 frames, 400 ms exp time)

Data from Pb+ at injection

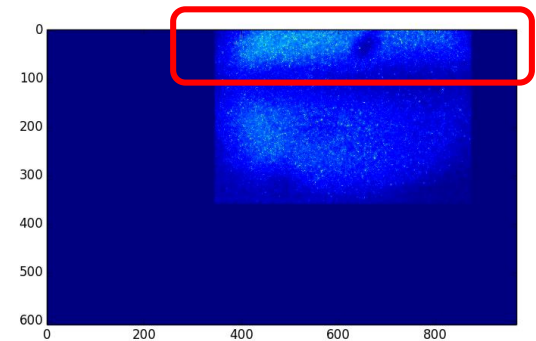
- Fill 7481, 28/11/2018. Acquired data at injection:
 - with / without gas and block filter, beam on
 - with / without gas and 585 nm filter, beam on
- Fill 7487, 30/11/2018. Acquired data at injection:
 - With gas, no beam, 585 nm filter
 - With gas, with beam, 585 nm filter



585 nm, gas **ON**, beam **OFF**
“photon counting” over 577.6 s
(1440 frames, 400 ms exp time)



585 nm, gas **OFF**, beam **ON**
“photon counting” over 210.8 s
(527 frames, 400 ms exp time)

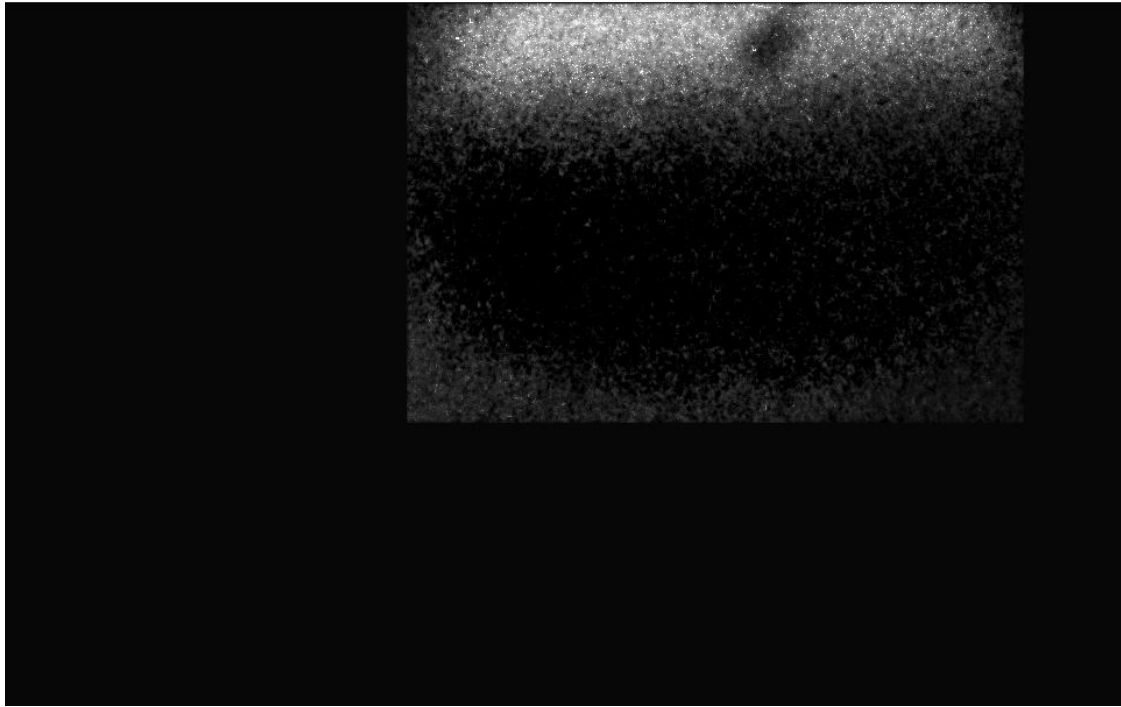


585 nm, gas **ON**, beam **ON**
“photon counting” over 1286.4 s
(3216 frames, 400 ms exp time)

Data from Pb+ at injection

- Background (beam off gas on, beam on gas off) subtracted from data.
Different exposure times accounted for:

$$\text{Result}(x,y) = \text{Signal}(x,y) - \frac{3216}{1440}\text{BG}(\text{gas ON, beam OFF})(x,y) - \frac{3216}{527}\text{BG}(\text{gas OFF, beam ON})(x,y)$$



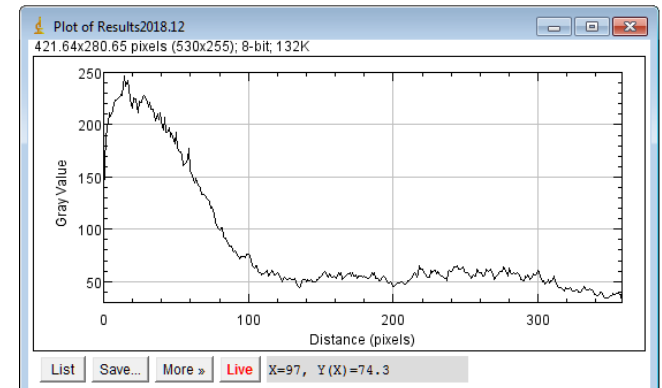
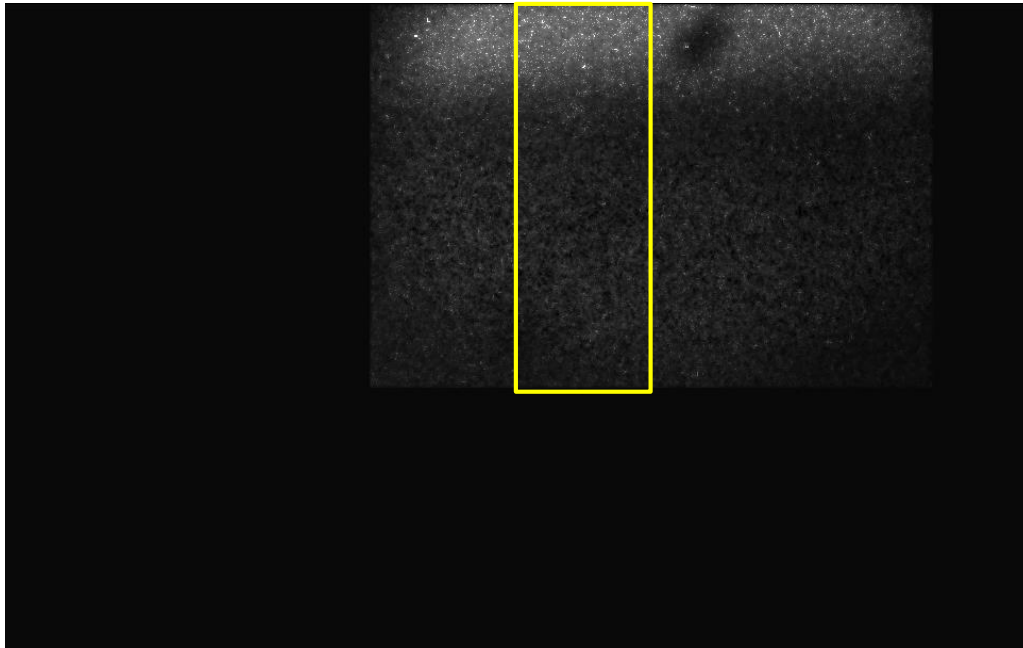
Data from Pb+ at injection

- Transverse size? Streak at the edge of image, difficult to analyse.
- From vertical projection, compatible with a line of

FWHM = $90 \times 40 \text{ um} = 3600 \text{ um} \pm$ error to be estimated

$\sigma = 2.35 \text{ FWHM} = \mathbf{1500 \text{ um}}$ \pm error to be estimated

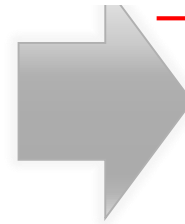
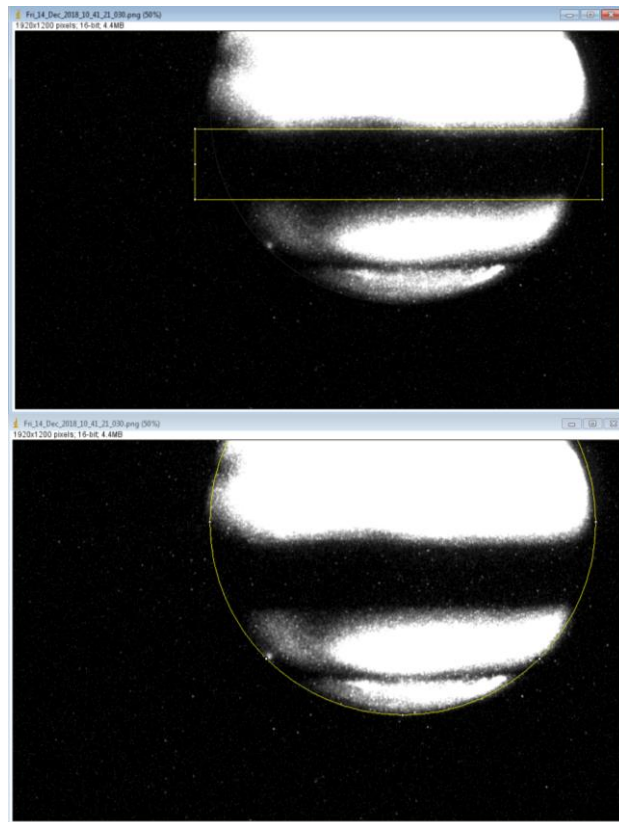
PRELIMINARY!



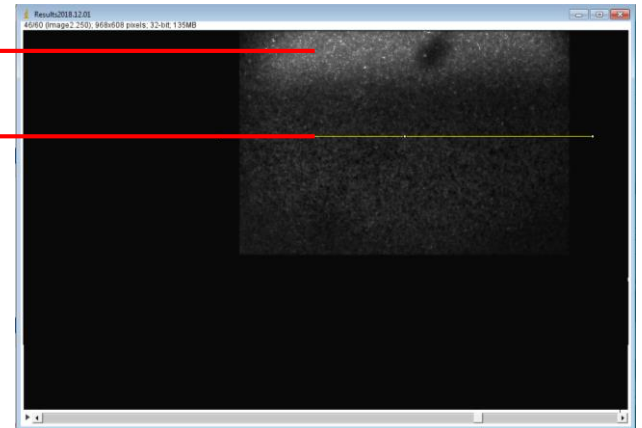
Within order of magnitude from expected σ (1 mm). Long exp time, no orbit feedback at injection

Data from Pb+ at injection

HOWEVER Horizontal position off by several mm.

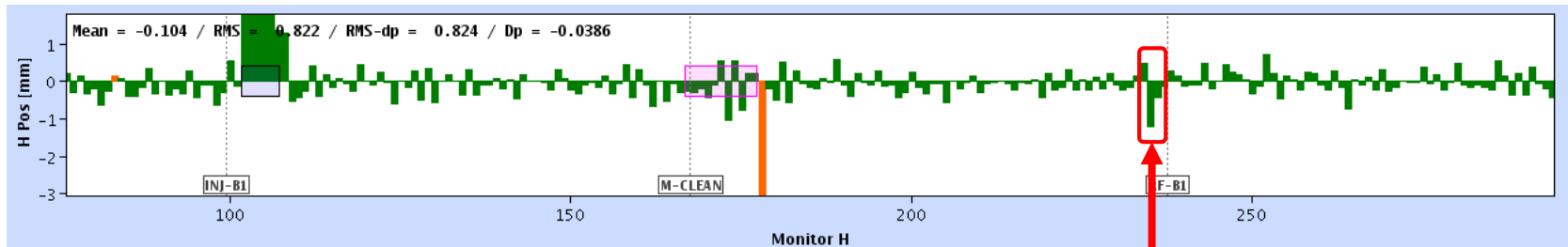


Vertical offset: 5.5 mm



Data from Pb+ at injection

- Orbit position during injection deviates of max 1.2 mm. (shown 30/11/2018, 18:30:59 hh:mm:ss)
- Will check with BPM team to find out exact absolute displacement



BPMYA.5L4.B1
BPMWI.5L4
BPMWA.5L4

- Vacuum chamber alignment? Check it tilted wrt vertical

Conclusions & outlook

- *Some* signal found with Pb+ at injection only when both gas and beam are present
- Signal *compatible* with a 1.5 mm sigma streak.
- Apparent position is 5.5 mm off the BP centre in the H plane: excessive for LHC beam

TO BE CHECKED:

- Position of beam from BPMs during injection
- Beam jitter during injection (orbit feedback is off at injection)
- Alignment of chamber, lab tests to confirm (or not) the 5.5 mm offset