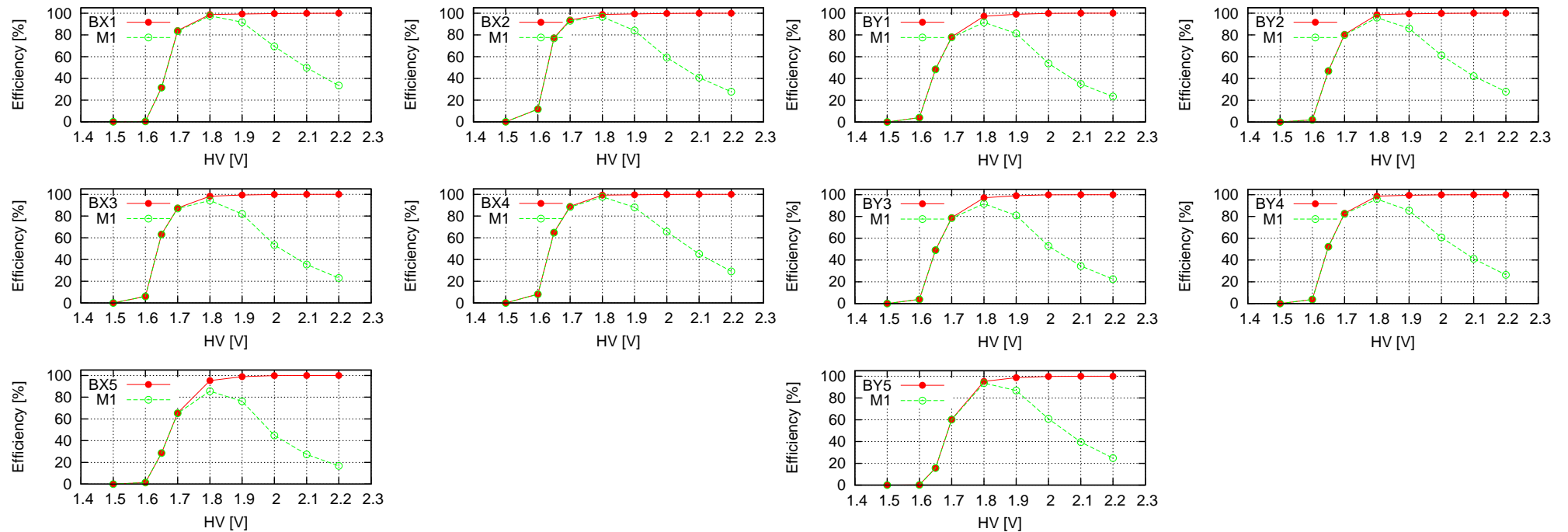


BDC memo-3 @HIMAC PH2

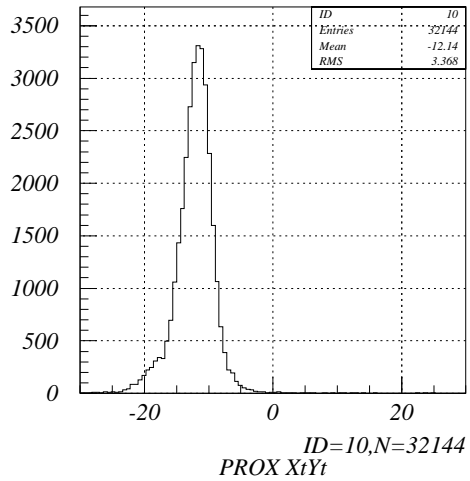
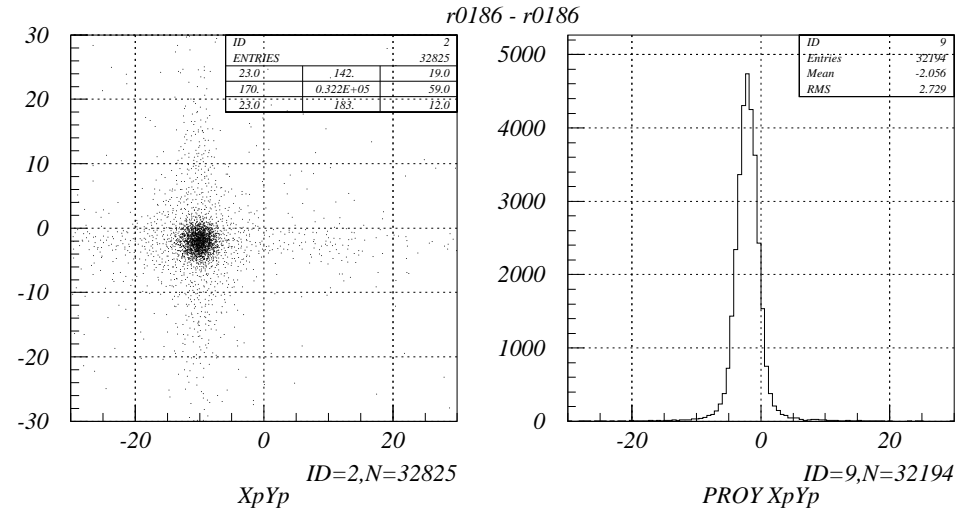
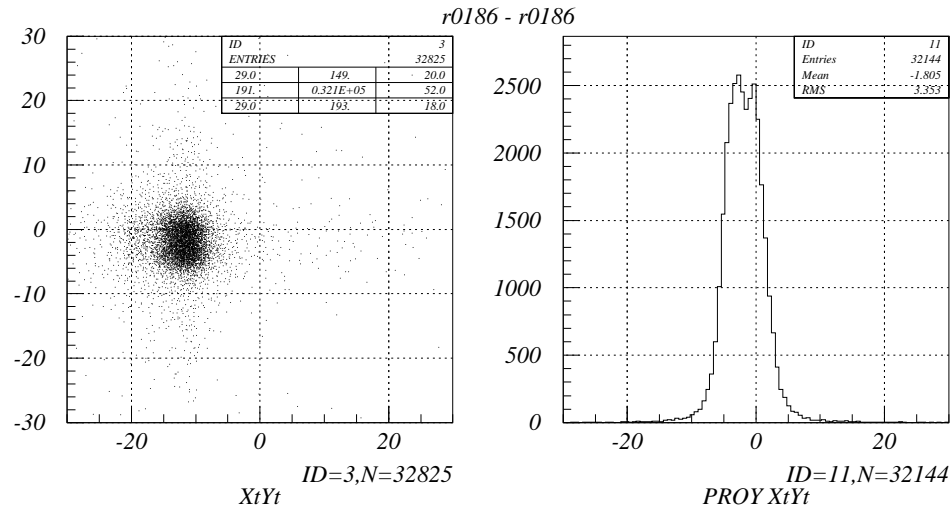
Kobayashi T.
23-Feb-2016

- from data of 22-Feb-2016 ~ 23-Feb-2016 overnight run

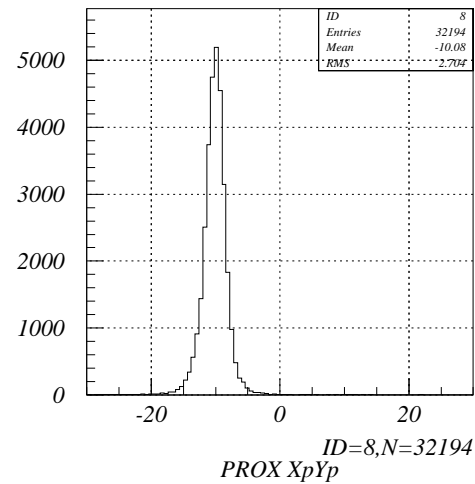
- Trigger : SBT1*SBT2, window discriminator threshold ?
- TDC common-stop delay ~ 1 usec
- Beam
 - intensity ~ 17 kpps
 - focus : large in vertical direction
- Data
 - run0184(1.5kV) \sim run0176(2.2kV)
- $\text{HV}(^{16}\text{O}) = 2.0$ kV



- normal transport ("narrow beam"): run0186 (100 kpps, beam trigger)
- $X_{\text{target}} * Y_{\text{target}}$
- $X'_{\text{target}} * Y'_{\text{target}}$

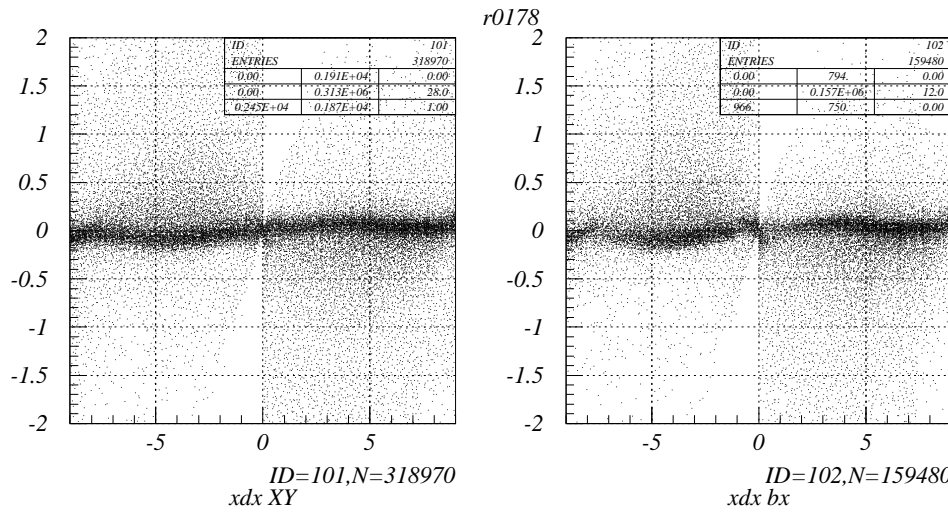


$$\sigma_x \sim \sigma_y \sim 3.4 \text{ mm}$$

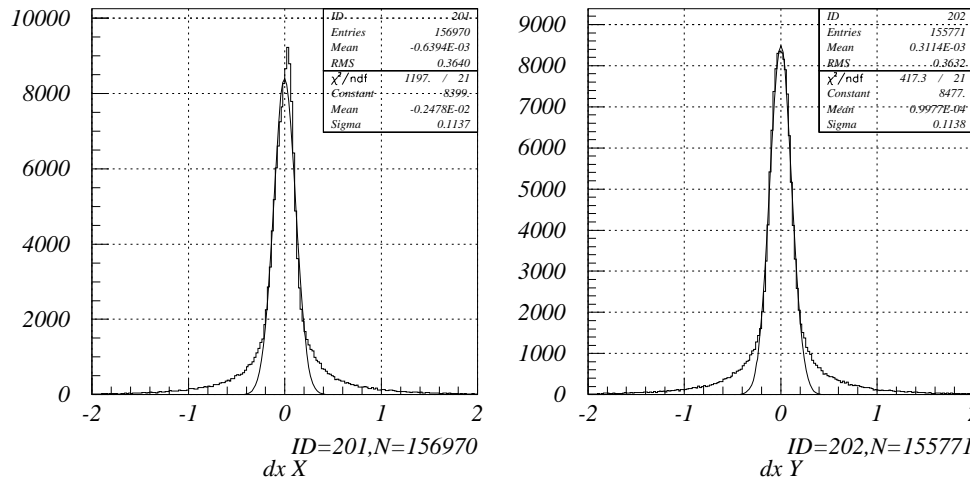


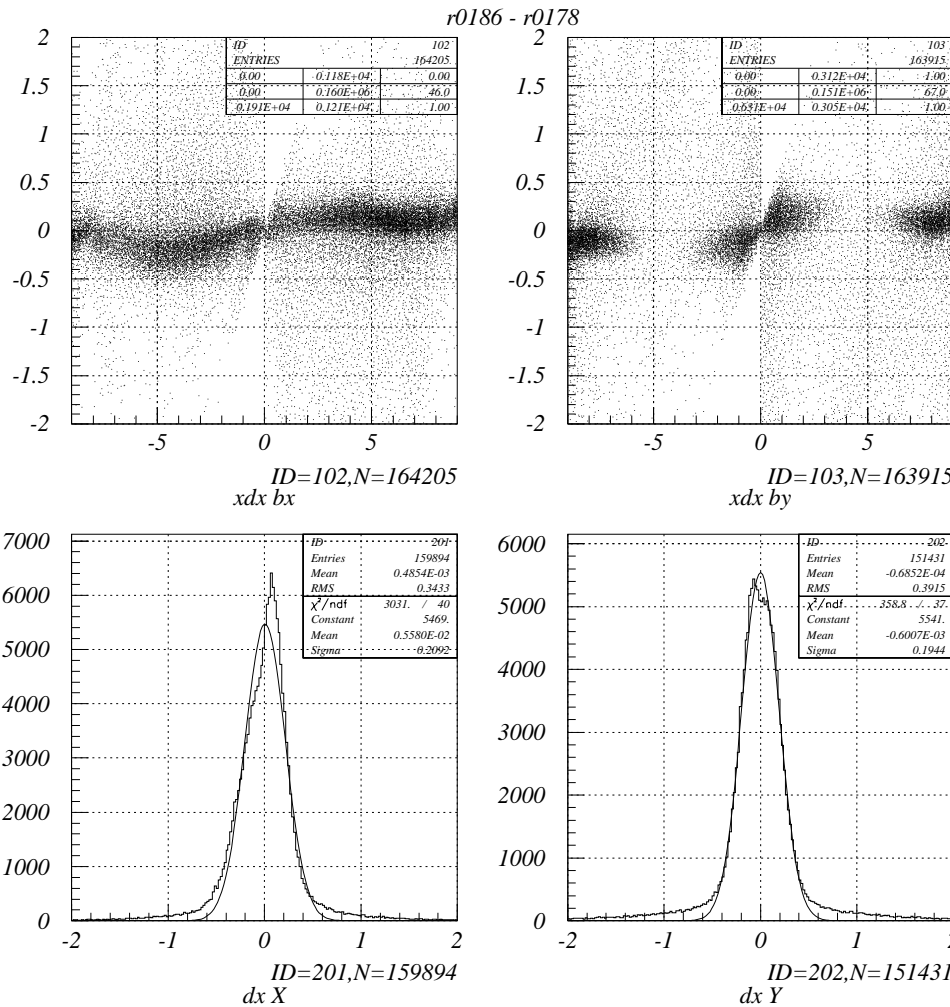
$$\sigma_x \sim \sigma_y \sim 3 \text{ mrad}$$

- Position offset, $\Delta x \sim 12 \text{ mm}$, may be due to the mis-alignment of BDC (?)

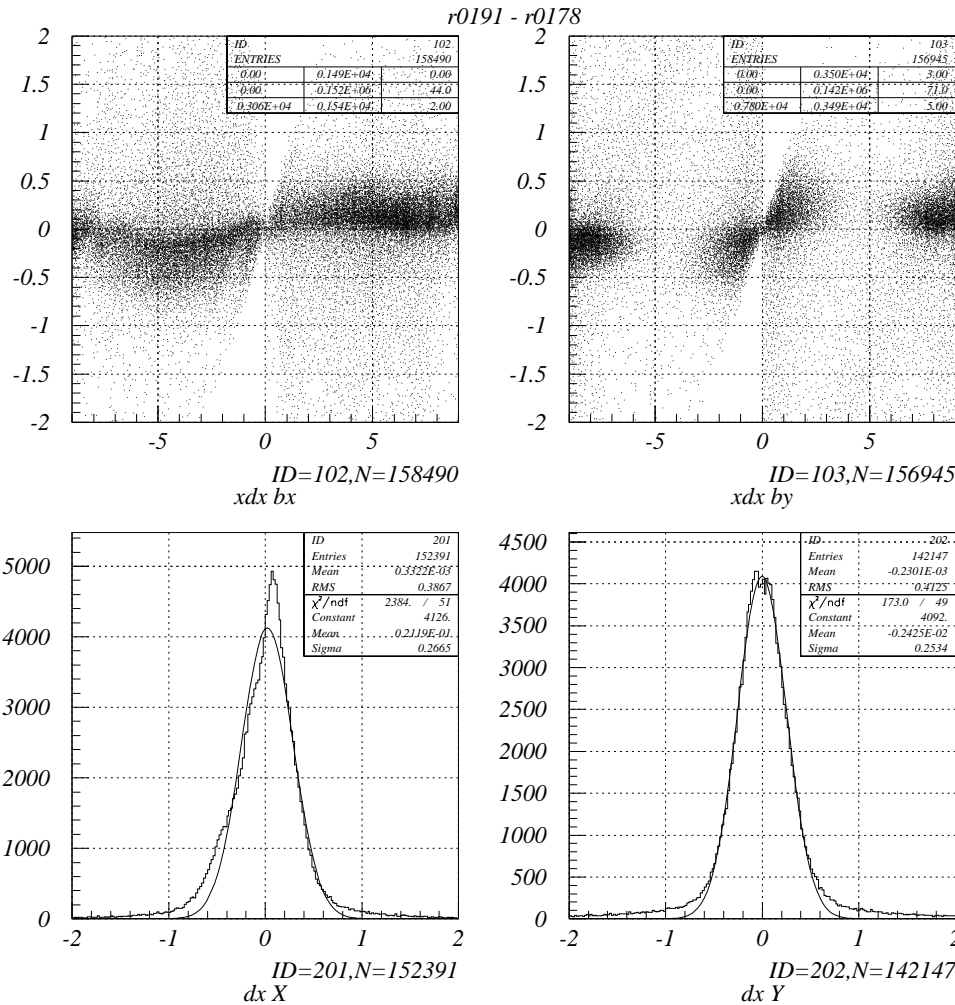


- STC calibration
 - self calibration : R0178
 - position dependence still left
- residue (resolution)
 - $\sigma_x \sim 114$ (148) μm
 - $\sigma_y \sim 114$ (148) μm
- position resolution / plane
 - $\sigma \sim 150$ μm
 - probably good enough

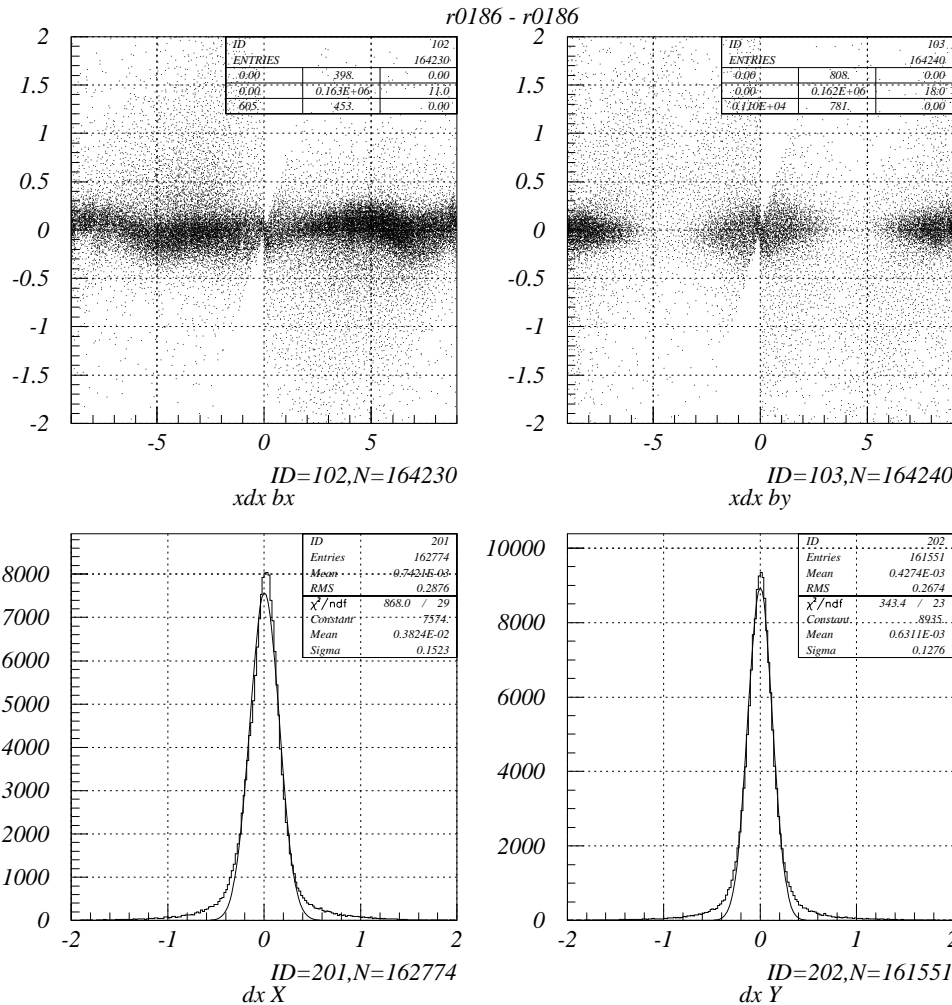




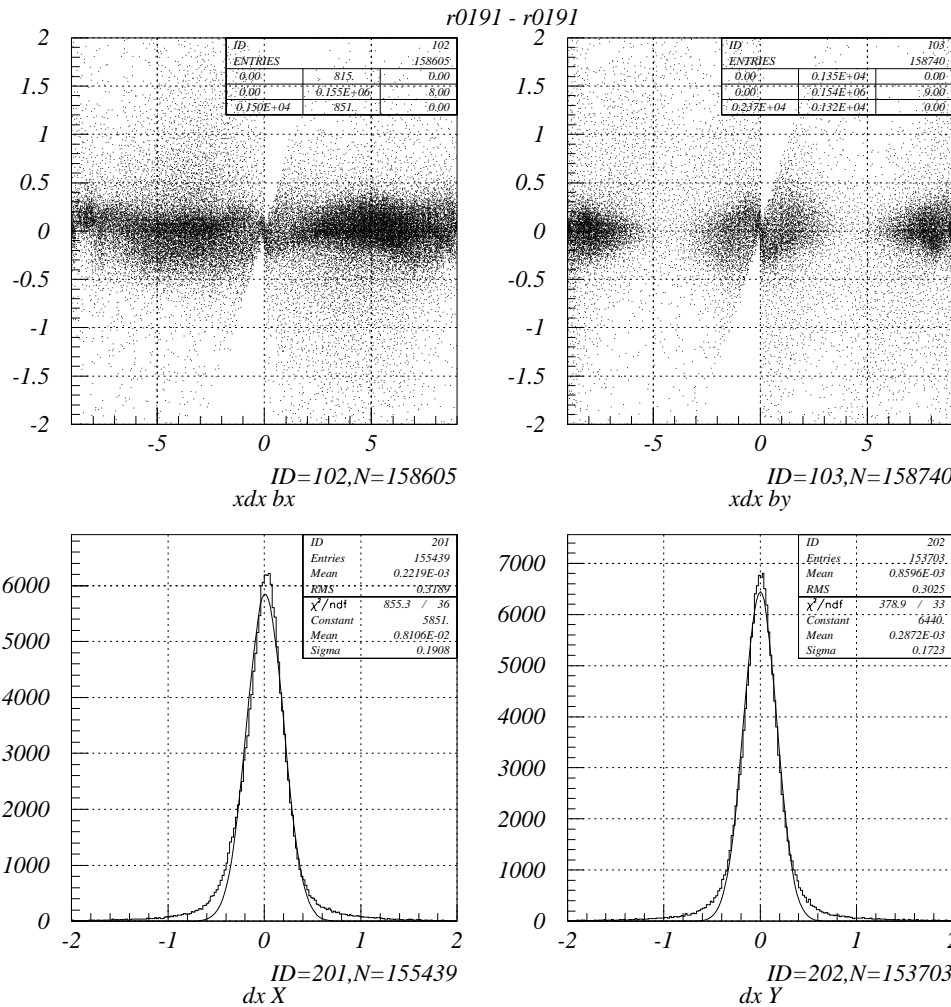
- STC calibration
 - R0178 calibration used
 - deviation
 - need own calibration
 - reason ?
- residue (resolution) : bad
 - $\sigma_x \sim 210$ (273) μm
 - $\sigma_y \sim 195$ (254) μm
 - factor of ~ 1.8 worse w R0178



- STC calibration
 - R0178 calibration used
 - deviation
 - need own calibration
 - reason ?
- residue (resolution) : bad
 - $\sigma_x \sim 265$ (345) μm
 - $\sigma_y \sim 255$ (332) μm
 - factor of ~ 2.3 worse w R0178

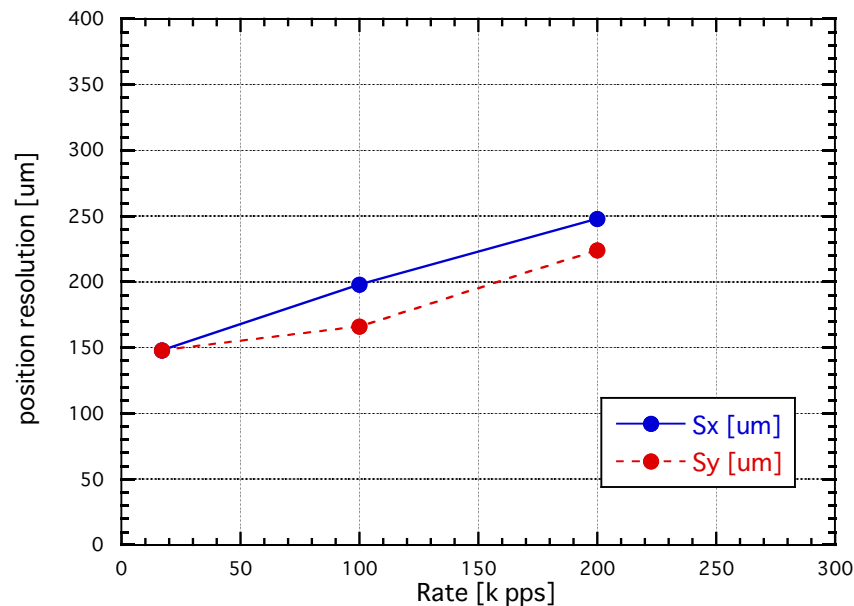


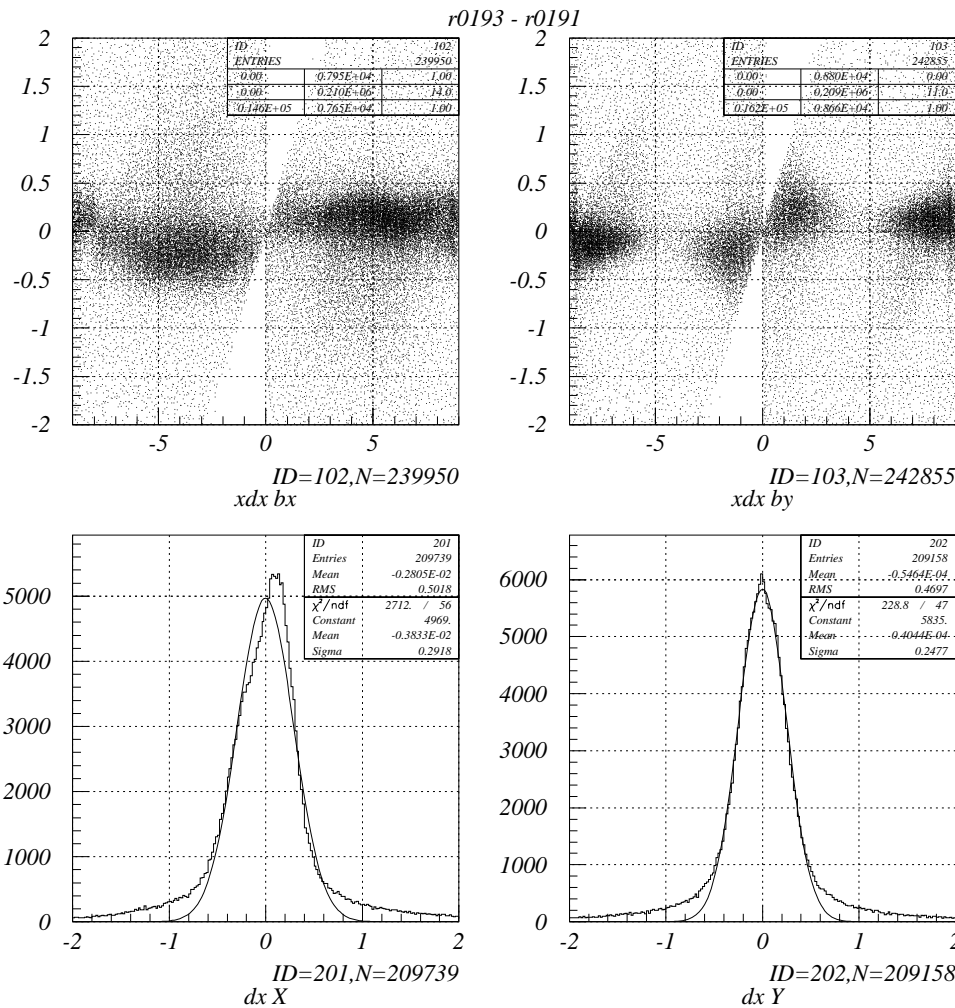
- STC calibration
 - self calibrated : R0186
 - (position-dependence still left)
- residue (resolution)
 - $\sigma_x \sim 152$ (198) μm
 - $\sigma_y \sim 128$ (166) μm
- position resolution / plane
 - $\sigma(100\text{kpps}) \sim 200$ μm
 - cf $\sigma(17\text{kpps}, \text{R0178}) \sim 150$ μm



- STC calibration
 - self calibrated : R0191
 - (position-dependence still left)
- residue (resolution)
 - $\sigma_x \sim 191$ (248) μm
 - $\sigma_y \sim 172$ (224) μm
- position resolution / plane
 - $\sigma(200\text{kpps}) \sim 250$ μm
 - cf $\sigma(17\text{kpps}, \text{R0178}) \sim 150$ μm

- beam-trigger run @HV(BDC)= 2.0 kV
- STC calibration is beam-rate dependent.
 - checked by run0178 (17k pps), run0186(100k pps), run0191(200k pps)
 - no beam-trigger run for 300 k pps
 - why?
 - beam hits single cell in each plane, and field gradient decreases due to space-charge effect?
 - need STC calibration using its own data
- position resolution/plane becomes worse at higher beam rate





- STC calibration
 - R0191 (beam trig) calibration used (same rate, different trigger)
 - shifted & worse
 - why? trigger timing shifted?
- residue (resolution)
 - $\sigma_x \sim 292$ (380) μm
 - $\sigma_y \sim 248$ (322) μm

- Reason is not clear : trigger timing shift between beam trigger & reaction trigger (??).
- reaction run also needs self calibration.