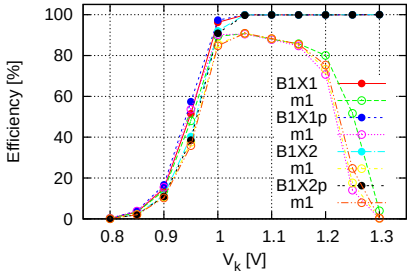
Memo on Samurai standard detectors for S13 (PolP)

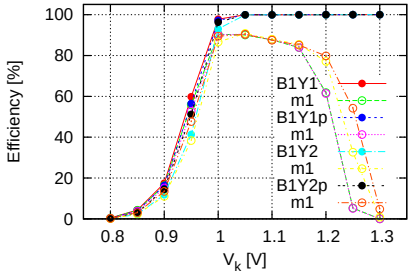
from data on 25-Jun-2016

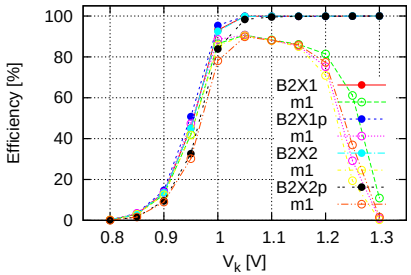
HV for BDC1, 2, FDC0, FDC2

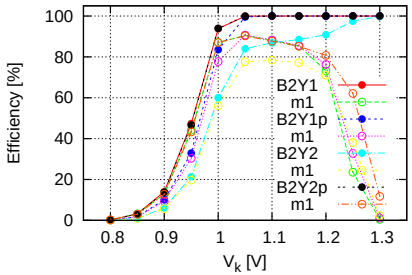
- Run0099 ~ Run0109
  - beam rate ~ 4kHz
  - condition : gated by z(sbt)=2 & z(hodf)=2

BDC1, BDC2

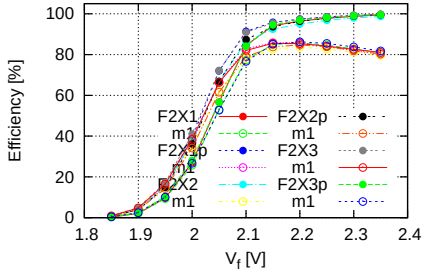


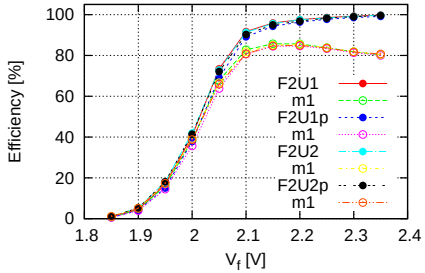


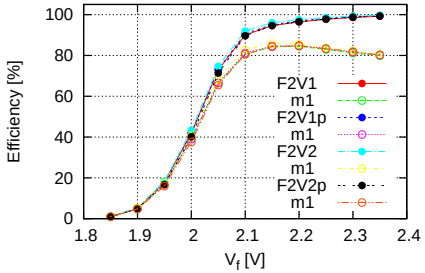




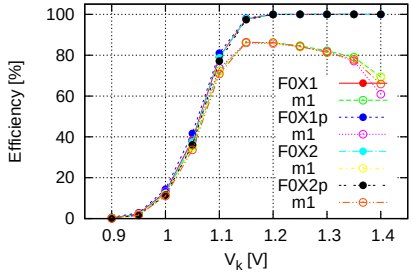
FDC2

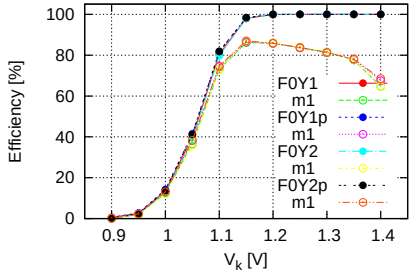






FDC0

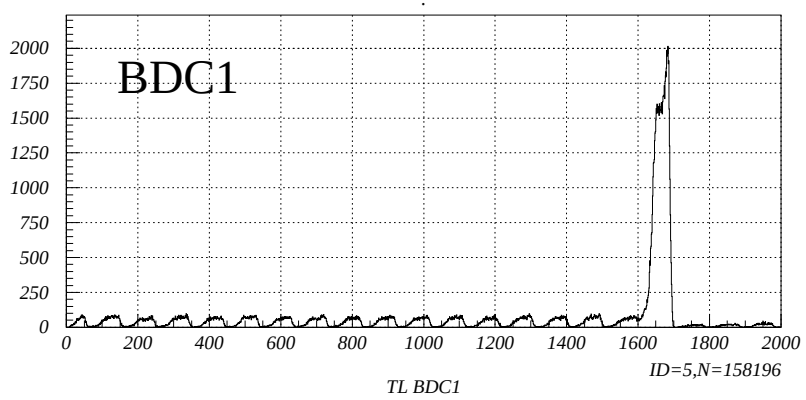


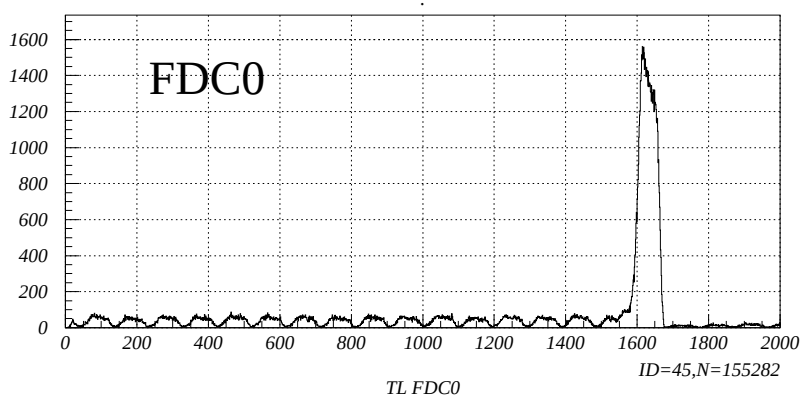


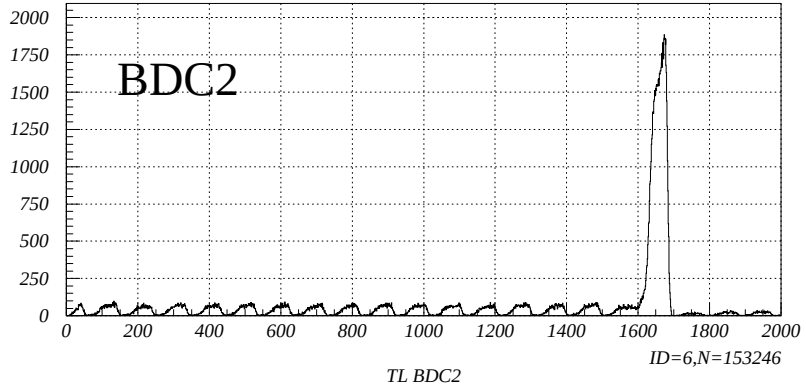
- problems:
  - BDC2-Y2 has ~15% lower efficiency
- HV set
  - BDC1, BDC2 : 1.1 kV
  - FDC0 : 1.2 kV
  - FDC2 : 2.2 kV

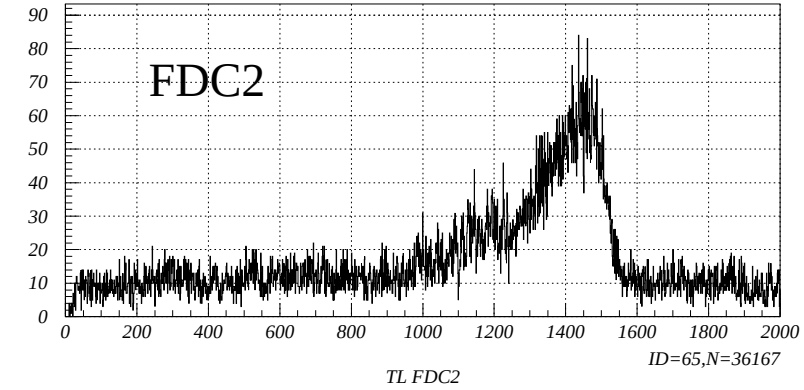
at higher rates

- at 600 kHz (beam=~ 440 kHz) with beam stopper
  - I(BDC1)~ 2.3 uA
  - I(BDC2)~ 2.0 uA (at 18:00 25-Jun. seems to slowly going up to 2.3 uA)
  - I(FDC0)~ 1.8 uA
  - I(FDC2)~ 1 uA
- Drift time distribution



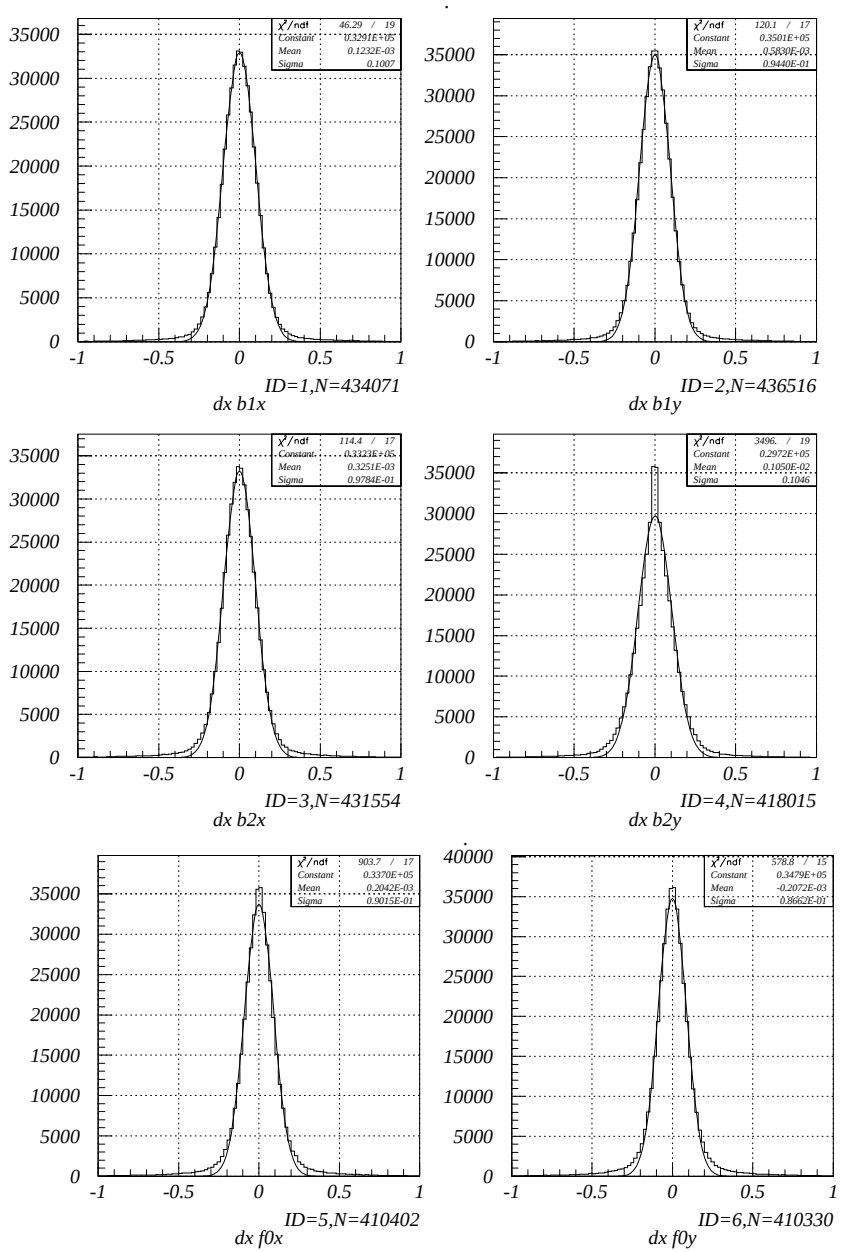






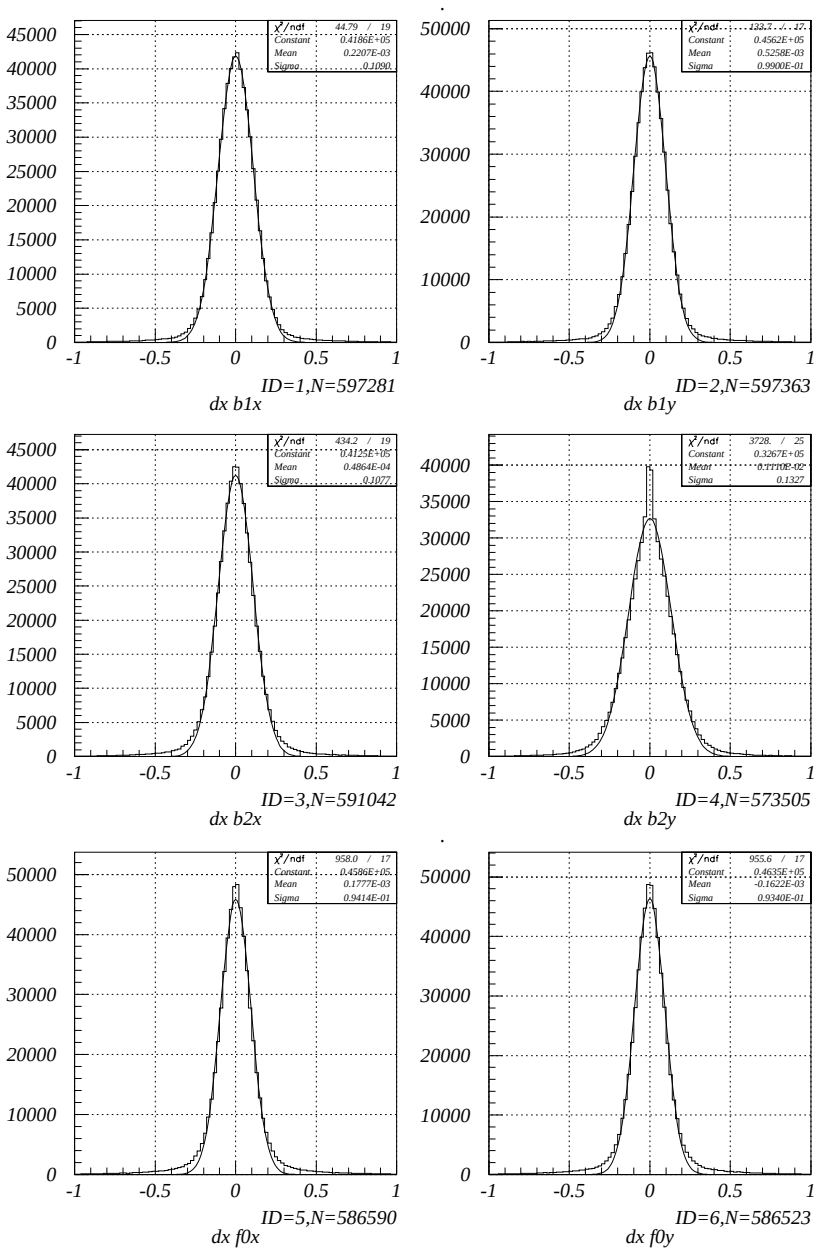
Resolution at low rate

- at low rate (~4kHz, run103)
  - BDC1 & 2 @HV= 1.1 kV
    - $\sigma_{residue}$ (x,y)= 95 ~ 105 um
  - FDC0 @HV= 1.2 kV
    - $\sigma_{residue}$ (x,y)= ~90 um
  - FDC2 @HV= 2.2 kV
    - $\sigma_{residue}$ (u,v)= ~ 250 um
    - $\sigma_{residue}$ (x)= ~ 350 um



Resolution at high rate

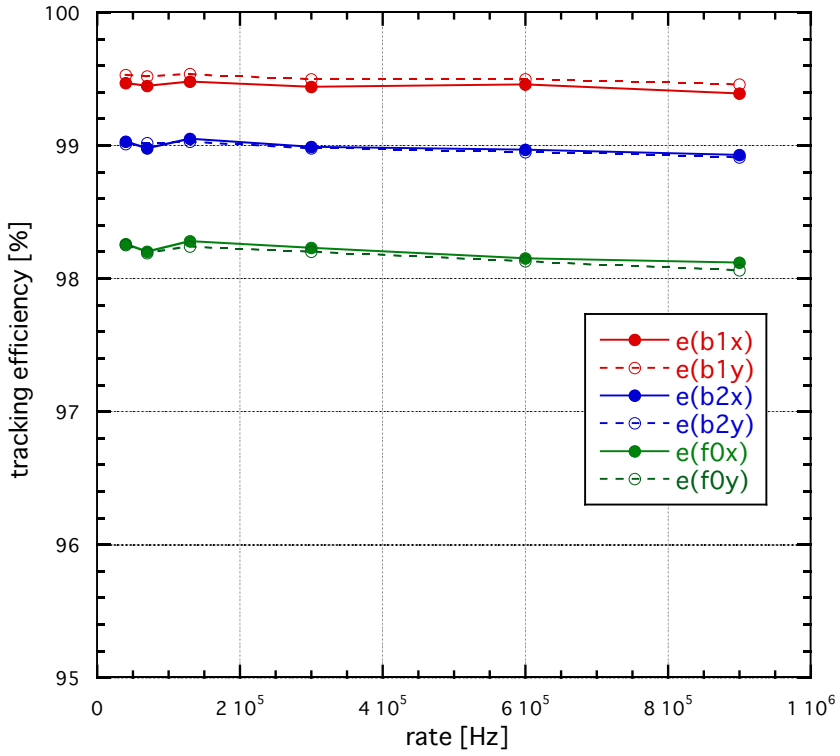
- at high rate (run127, ~600 kHz)
  - BDC1 & 2 @HV= 1.1 kV
    - $\sigma_{residue}$ (x,y)= 100 ~ 130 um
  - FDC0 @HV= 1.2 kV
    - $\sigma_{residue}$ (x,y)= ~95 um
  - about 10% worse compared with low rate (~4 kHz)



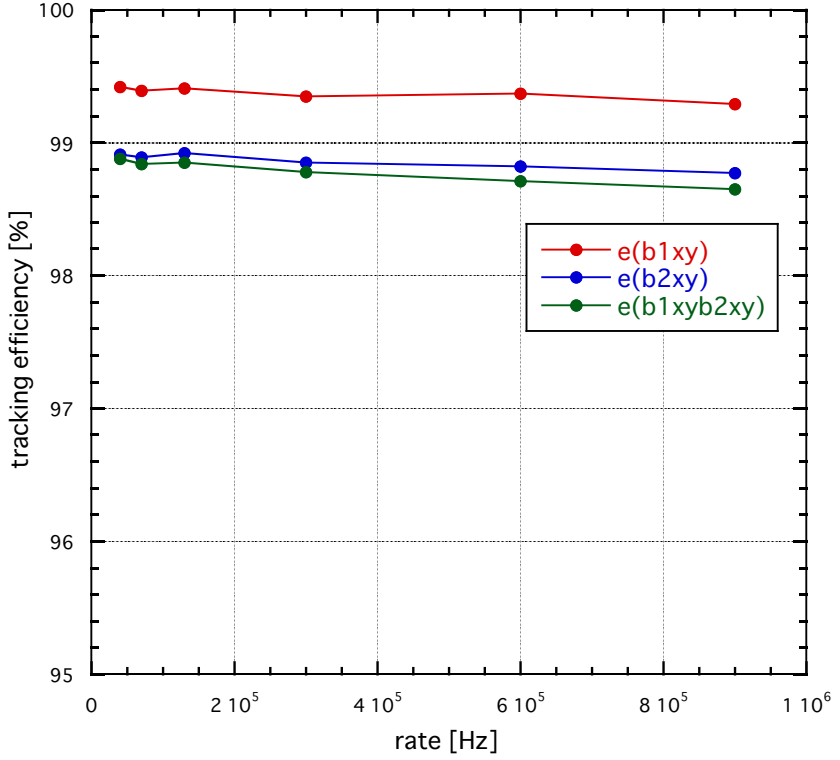
Tracking efficiency

- Since there are no downstream detectors to identify z=2 at high rate conditions, tracking efficiency rather than simple plane efficiency is studied
  - condition : gated by z(SBT)= 2
  - data : 40 kHz (run123) ~ 900 kHz (run129)
  - no cut on chi-2

ε_{track}(B1X, B1Y, B2X, B2Y, F0X, F0Y)

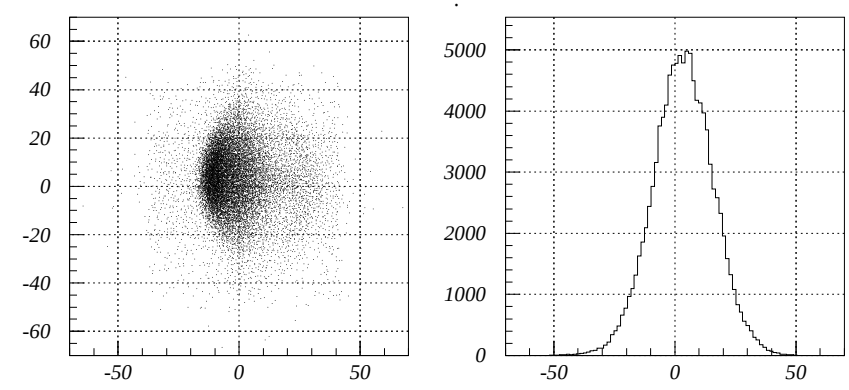


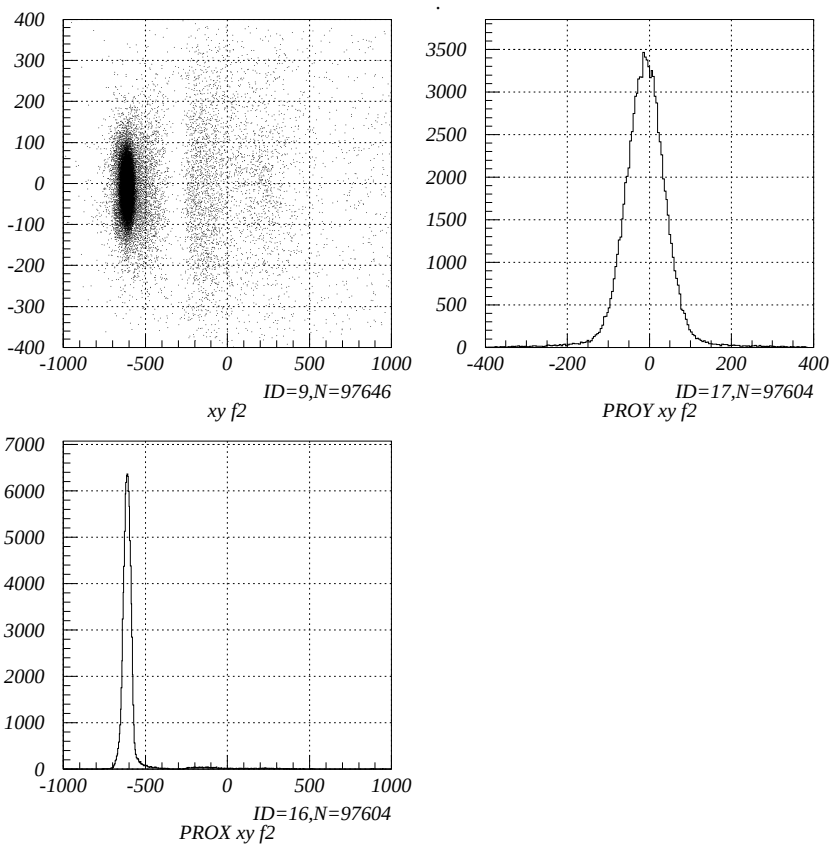
ε_{track}(B1XY, B2XY, F0XY, B1XYB2XYF0XY)



- (surprizingly) high efficiency even at the highest rate

- Beam track is almost centered at STQ25 exit (SBT)





- Beam profile @FDC2 center as expected ?