

Stacking mini-bunches for Emittance Exchange (II)

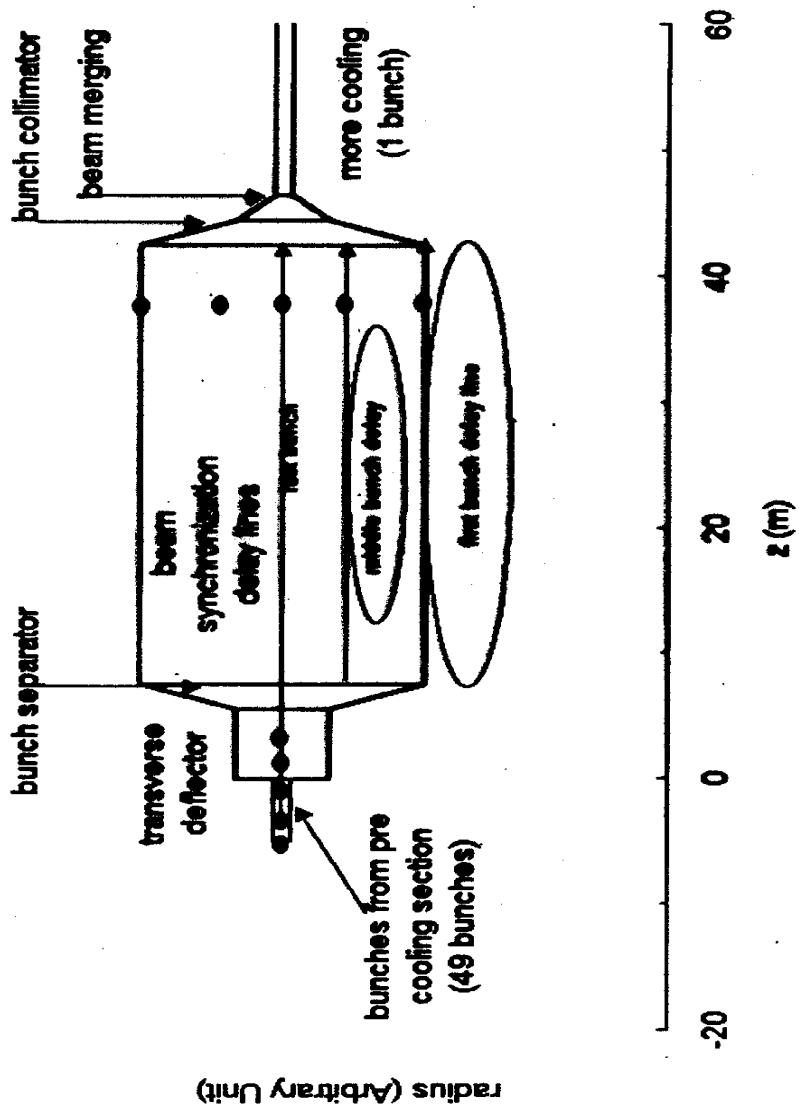
Yasuo Fukui

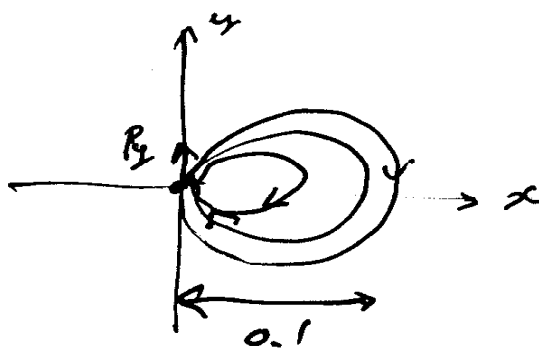
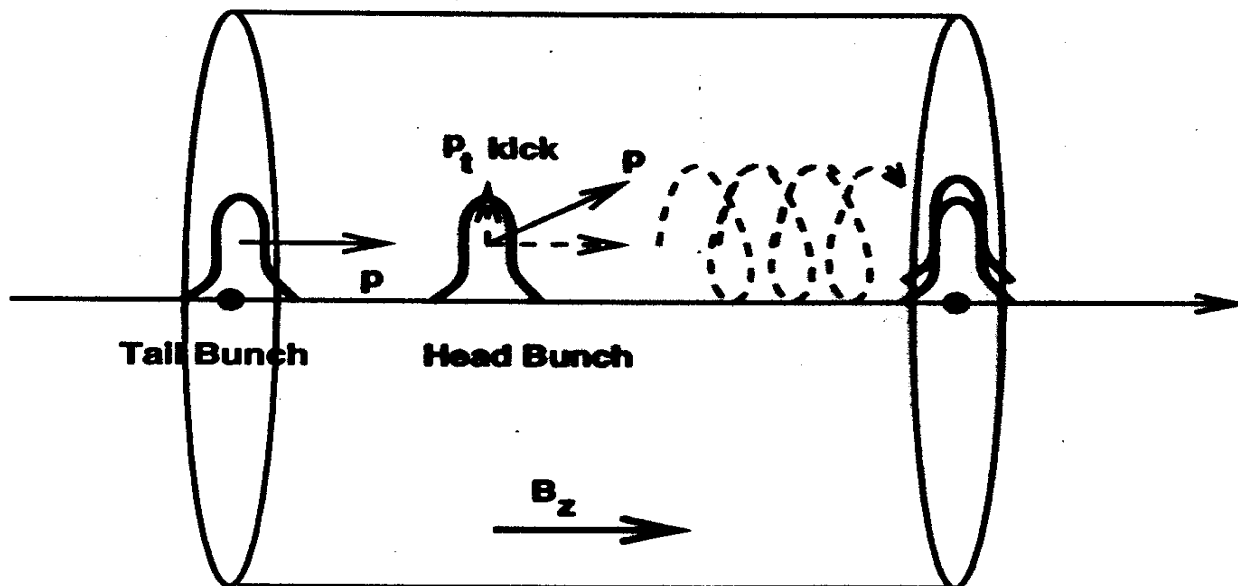
UCLA, fukui@slac.stanford.edu

- Stacked 10 mini-bunches in a simple solenoid channel by using β_z (vertical bending angle) adjustment
- Procedure(ICOOOL v2.08)
 - generate a mini-bunch
 - Initial phase space == 10 bunches without vertical bending
 - make 10 bunches with vertical bending
 - track 1000*10 ~~mu~~ *muons*
 - correct p_x and p_y to remove initial vertical bending
 - get the normalized emittance at the end of the solenoid

Figure 1

Emittance Exchange Schematic Diagram

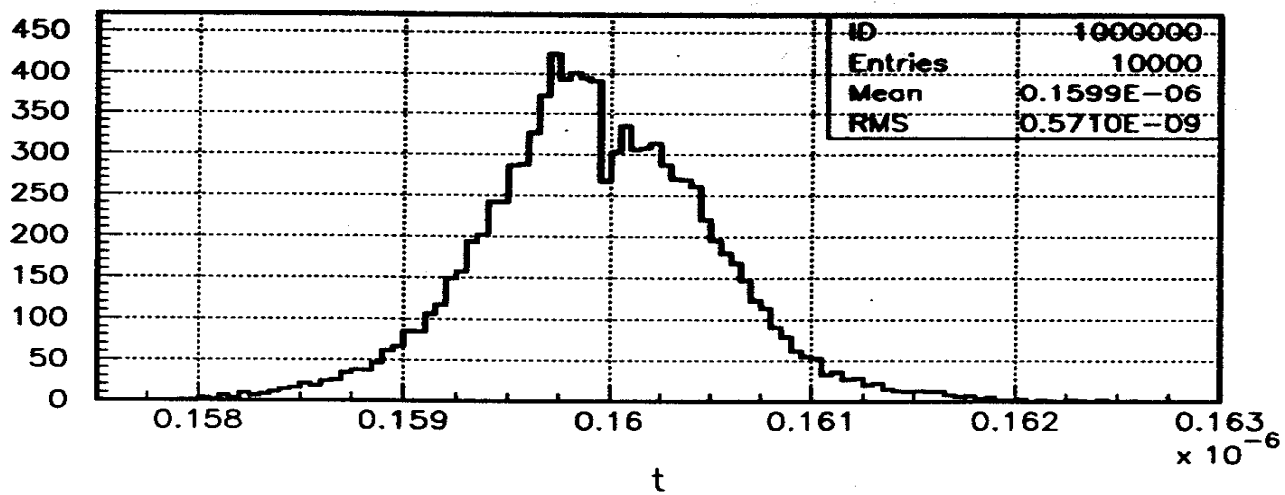
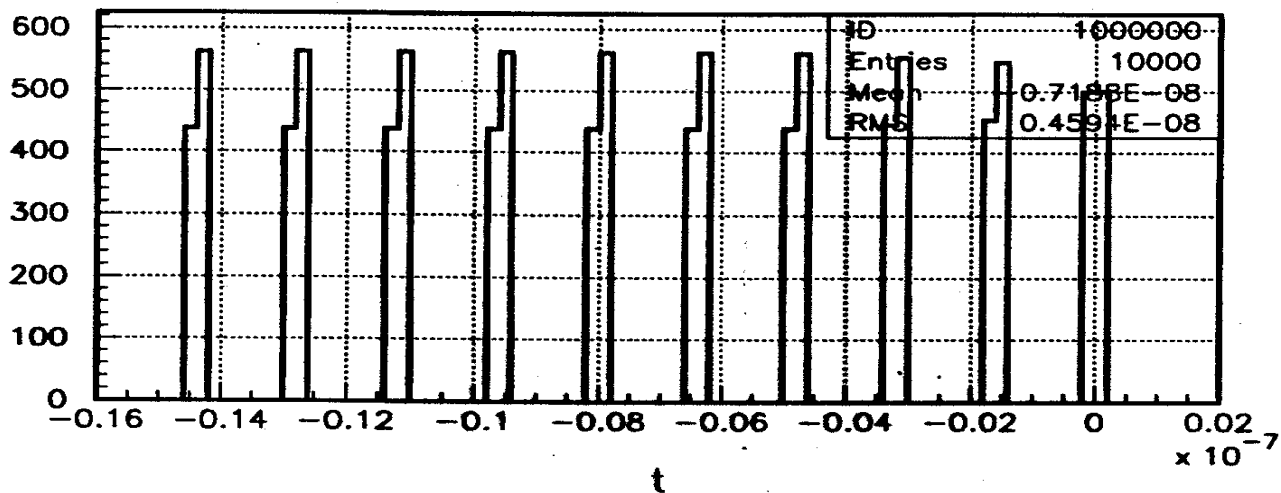


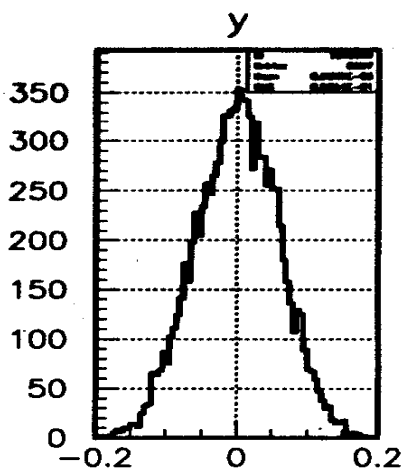
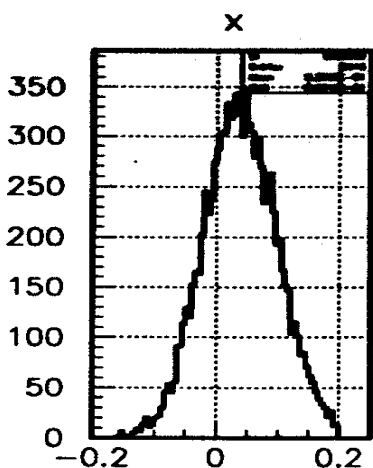
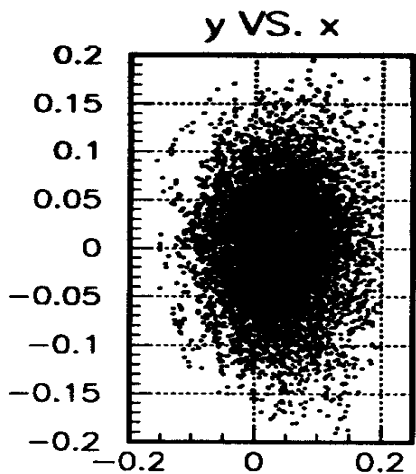
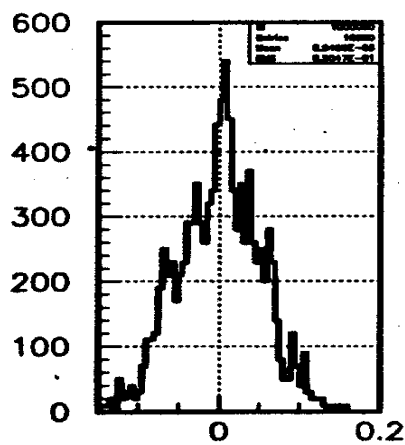
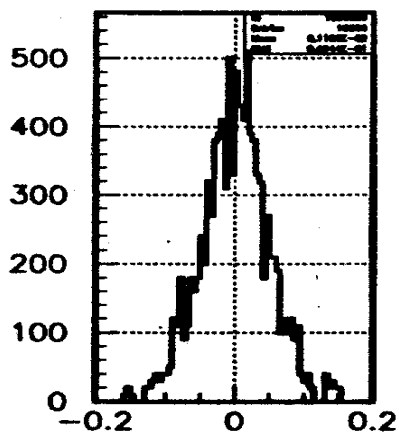
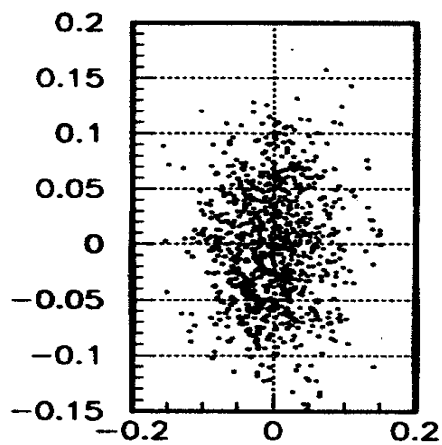


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Bunch Stacking Test Model in a Huge Solenoid
$cont npart=20000 nsections=1 timelim=5000. bgen=.false.
varstep=.false. nprnt=1 prlevel=-1 epsstep=1e-4 ntuple=.false.
phasemodel=3 neighbor=.false. dectrk=.true.
fsav=.true. izfile=175 bunchcut=1. spin=.true. output1=.true.
timelim=9999 $
$bmt nbeamt=1 $
1 2 1. 1 ! muon Gaussian distributed beam
0. 0.0 0. 0. 0. 0.200 !mean: x y z px py pz
0.05 0.05 0.020 0.0014 0.0014 0.002 !sigmas
0
$ints ldecay=.false. declev=1 ldedx=.true. lstrag=.true. lscatter=.true.
delev=2 straglev=4 scatlev=4 $
$nhis nhist=2 hauto=.true. hcprn=.false. $
-0.05 2e-3 50 1 1
-0.05 2e-3 50 2 1
$nscc nscat=1 sauto=.true. $
-0.6e-9 3e-11 40 7 1 -0.050 5e-3 20 6 1
$nzsh nzhist=1 zhauto=.true. $
4 0. 0.02857 70 0 0.01 20
$nrh nrhist=0 $
$nem nemit=1 sig_cut=50. pycorr=.true. $
104
$ncv ncovar=1 $
104
SECTION
REFP
2 .2 0. 0 3 1 0 3 .115 0 22
CELL
100
.false.
SOL
1 0 0 0 4.619 0 0 0 0 0 0 0 0 0 0 0
SREGION 1 ----- DRIFT
0.4239 1 0.01
1 0. 1.0
NONE
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
VAC
CBLOCK
0. 0. 0. 0. 0. 0. 0. 0. 0.
ENDCELL
ENDSECTION

```

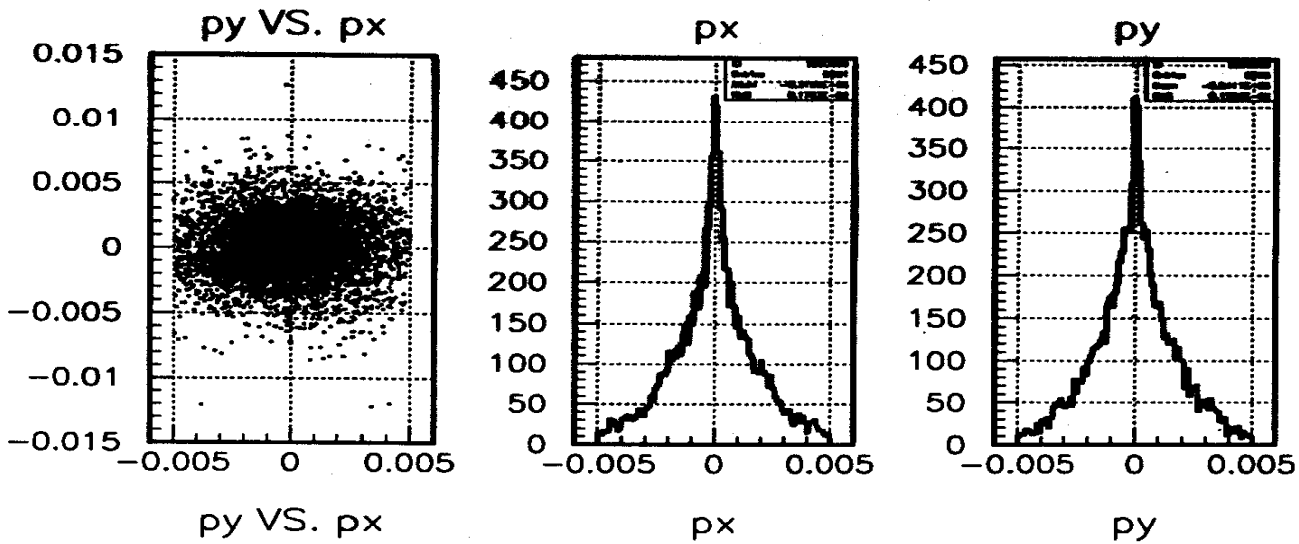
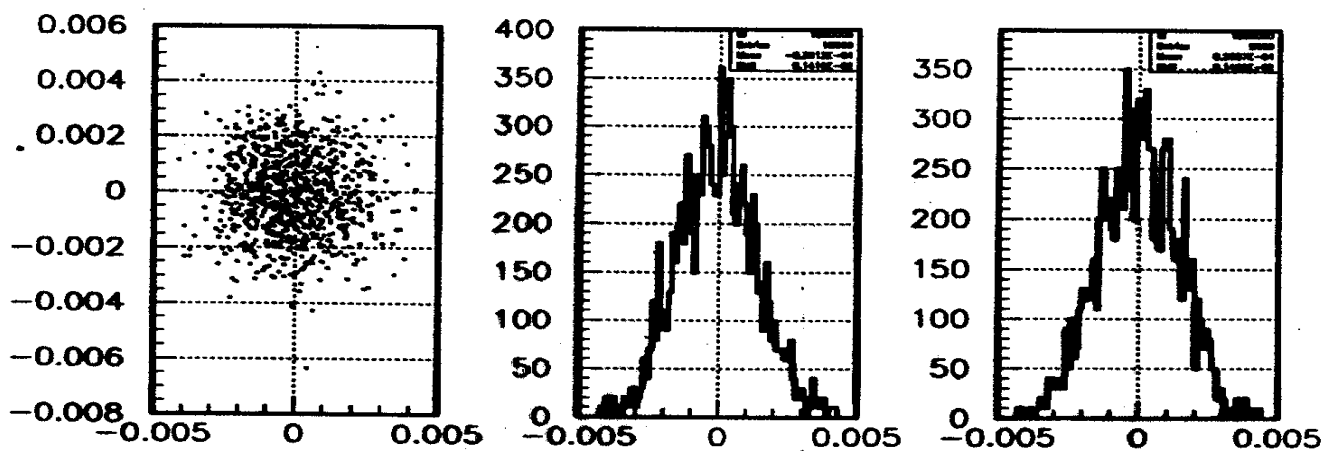


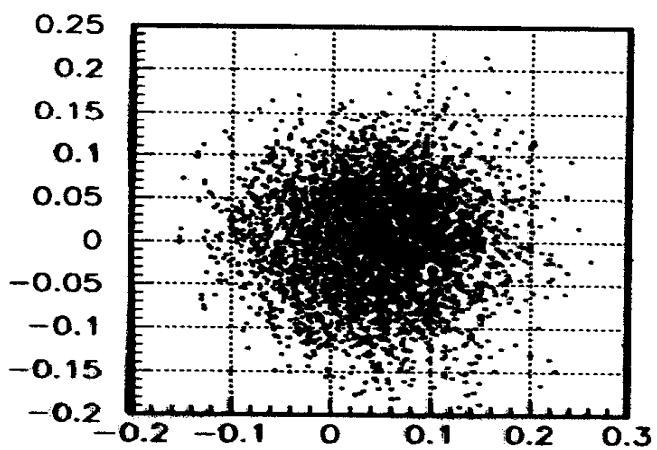


y VS. x

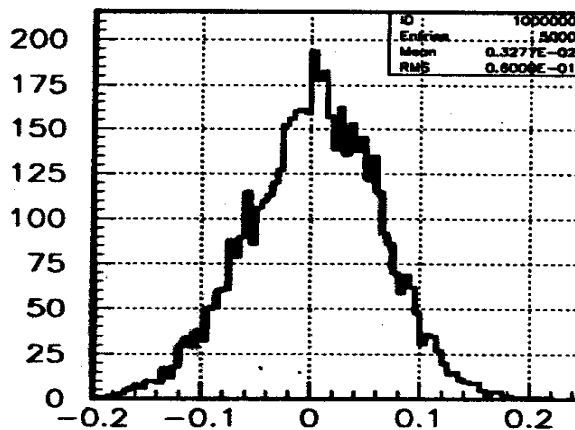
x

y

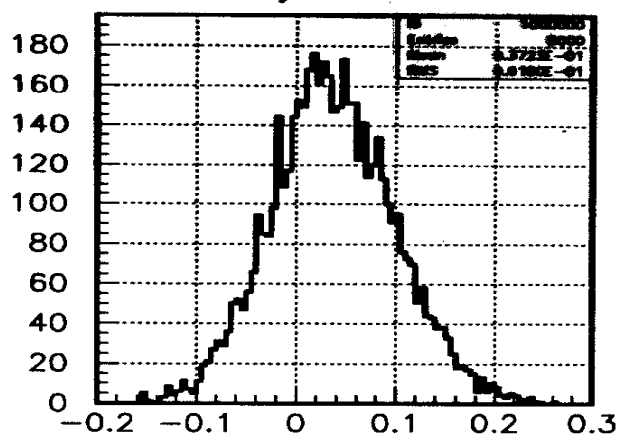




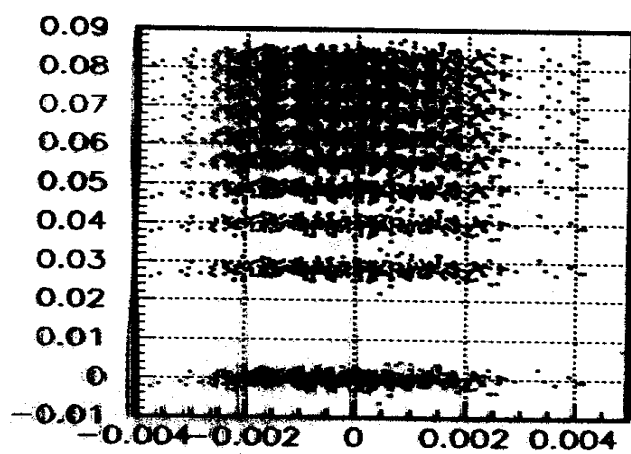
y VS. x



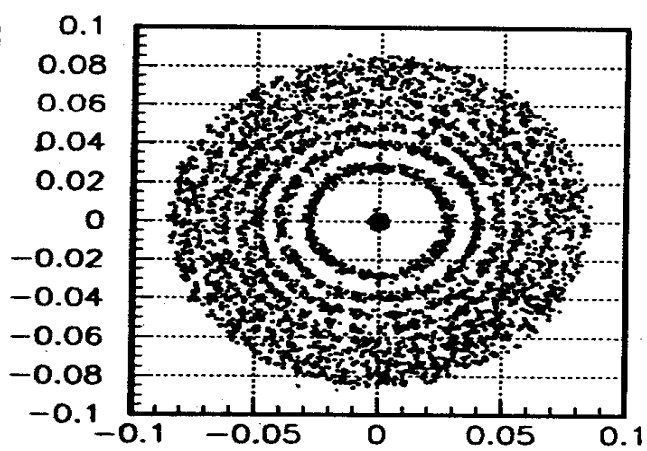
y



x



py VS. px



py VS. px

```

*****
Weighted NORMALIZED 2-D EMITTANCES
*****
SIGNACUT = T      PXYCORR = T      PZCORR = F      SIG_CUT = 50.0

des      No      N      emitX      emitY      emitZ      Tr      fET      fEL
      [m]      [m]      [m]
  4 10000. 10000. 0.2193E-01 0.2192E-01 0.2285E-01 1.000 1.000 1.000
104 10000. 10000. 0.3224E-01 0.3221E-01 0.1325E-02 1.000 1.000 1.000

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em(out)/em(in)      1.47      1.47      0.059      6D: 0.128

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Summary

- The simple model seems to work, which shows the potential of the stacking scheme.

