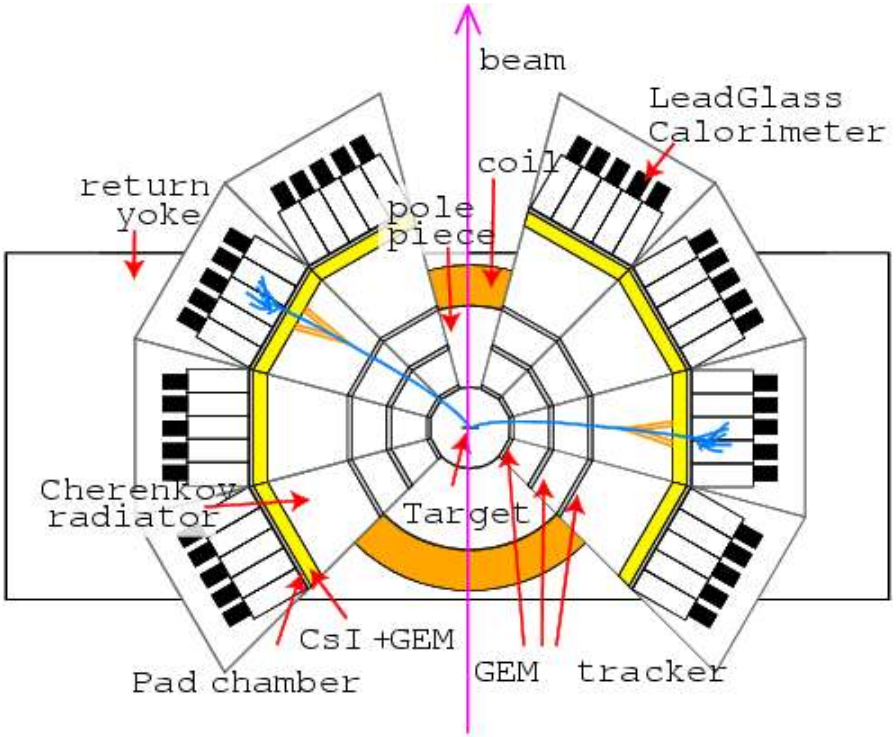
Primary beam line and the electron pair measurements

Satoshi Yokkaichi (RIKEN)

- new experiment (P16)
- E325 @ EP1B



Collaboration

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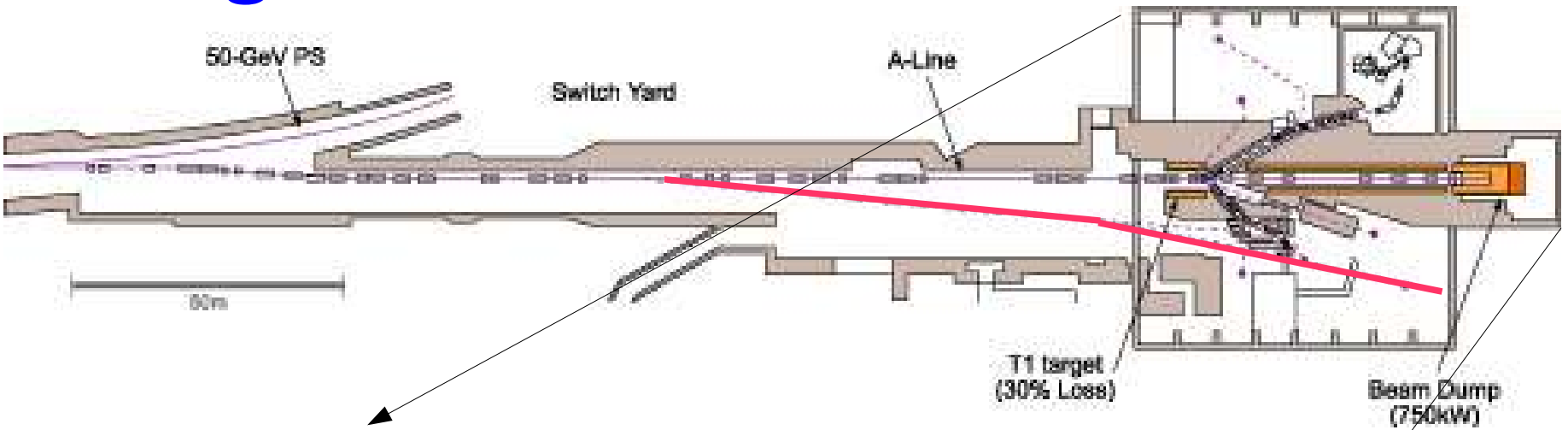
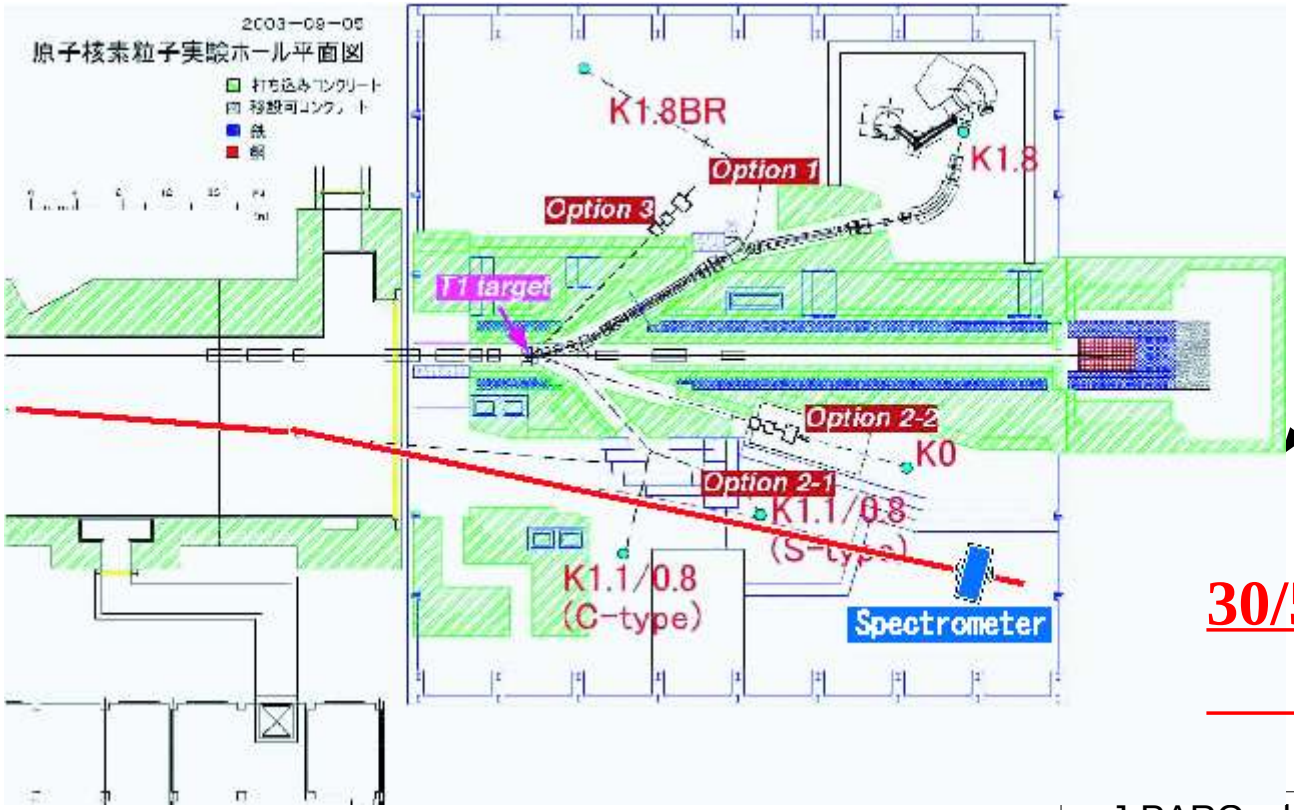
Kyoto-U	F. Sakuma, K. Aoki

High momentum Beamline





30/50GeV proton beam

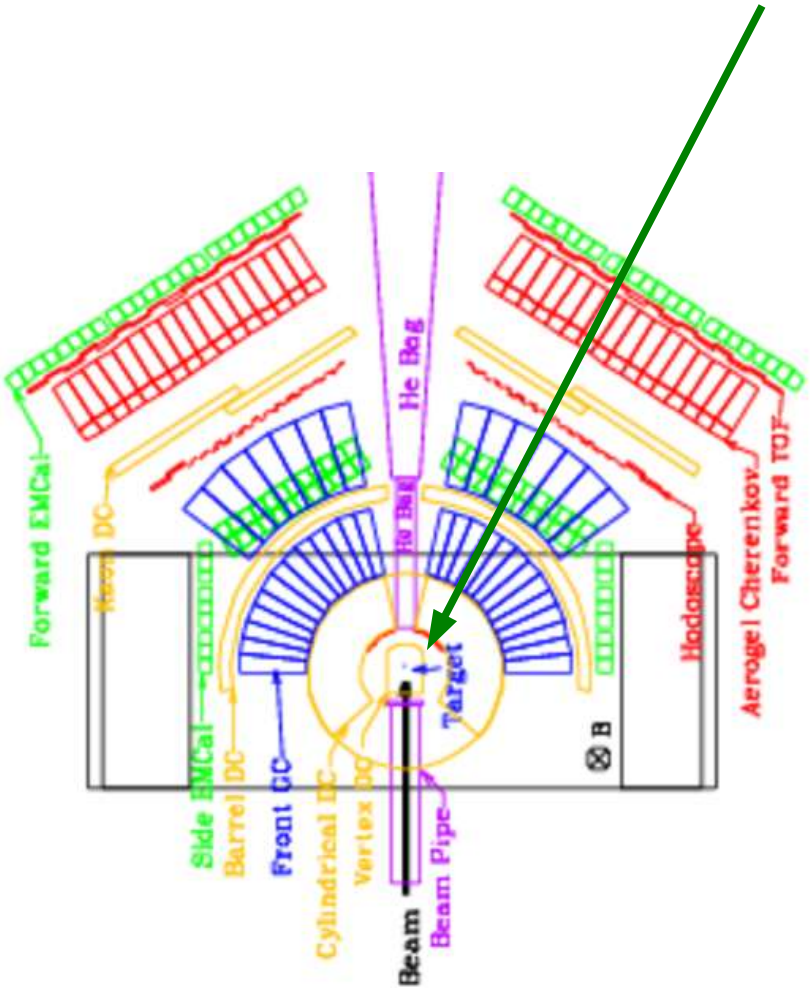
(~10^{10} /sec)

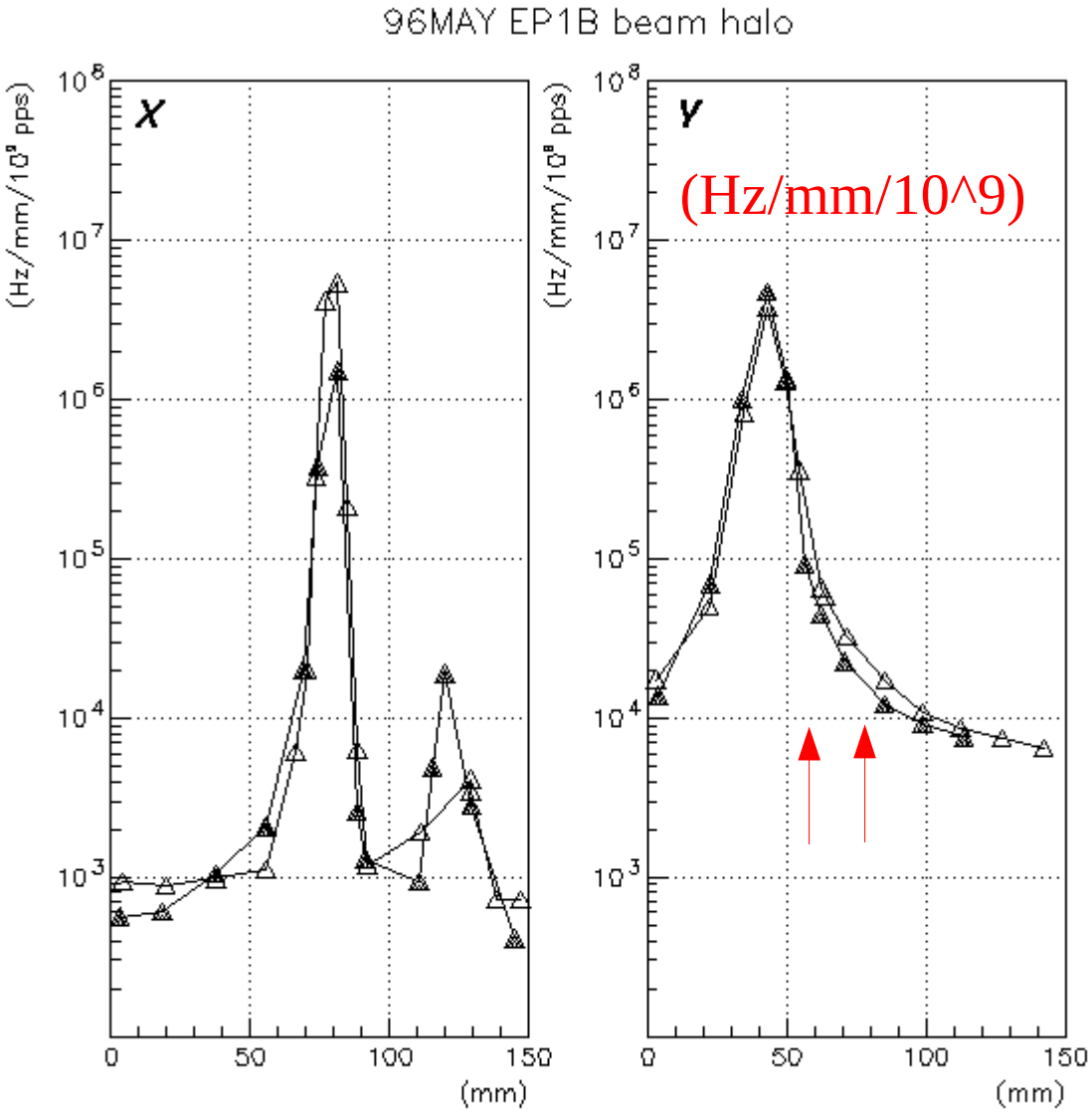
Next generation experiment at J-PARC

- vector meson mass modification
- Main goal : collect ~1 x 10^5 $\phi \rightarrow ee$ for each target in 5 weeks
  - ~100 times as large as E325
- Same concept as E325
  - thin target : suppress the conversion bkg / brems.... S/N
    - ~ 0.1 % interaction
  - high intensity beam (~10^{10} /sec) : (E325 x 10)
  - larger acceptance (x5) and larger production cross section (x2)
- Beam :
  - spot size : < 10mm ϕ
  - beam halo
    - intensity x 10^-4/mm(W) at 20mm from beam axis
    - x 10^-5/mm(W) at 40mm

beam halo

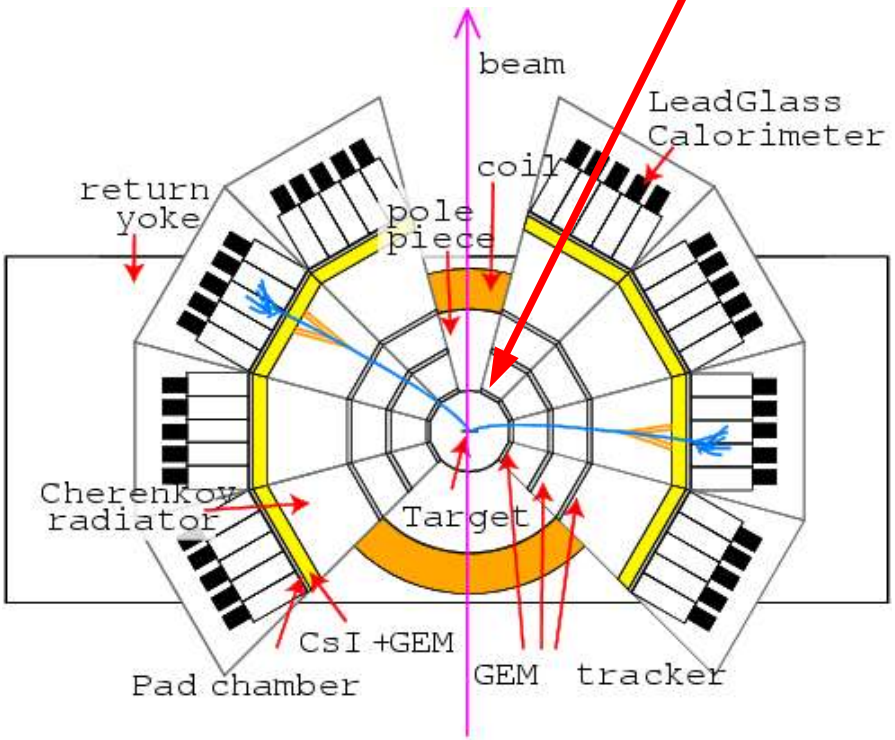
- intensity x 10^-4/mm(W) at 20mm
  - E325 VTC at 20mm
    - 100kHz/mm(W)/220mm(H)

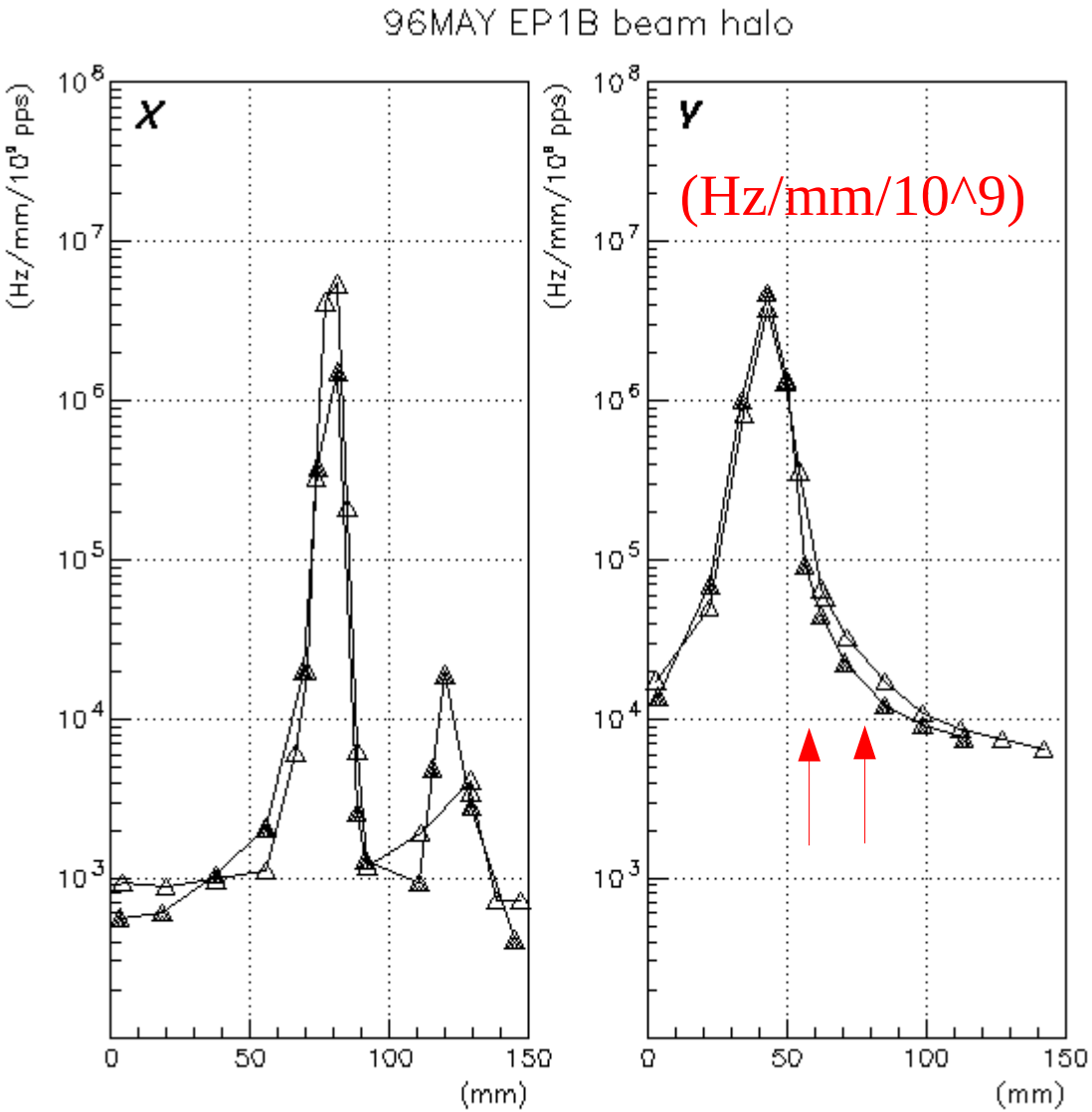




beam halo

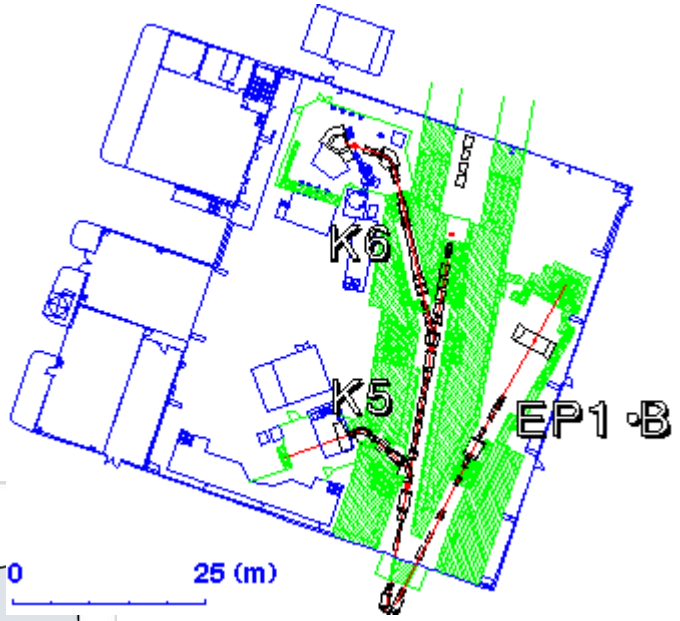
- intensity x 10^-4/mm(W) at 20mm
  - E325 VTC at 20mm
    - 100kHz/mm(W)/220mm(H)
  - new exp. : GEM Tracker

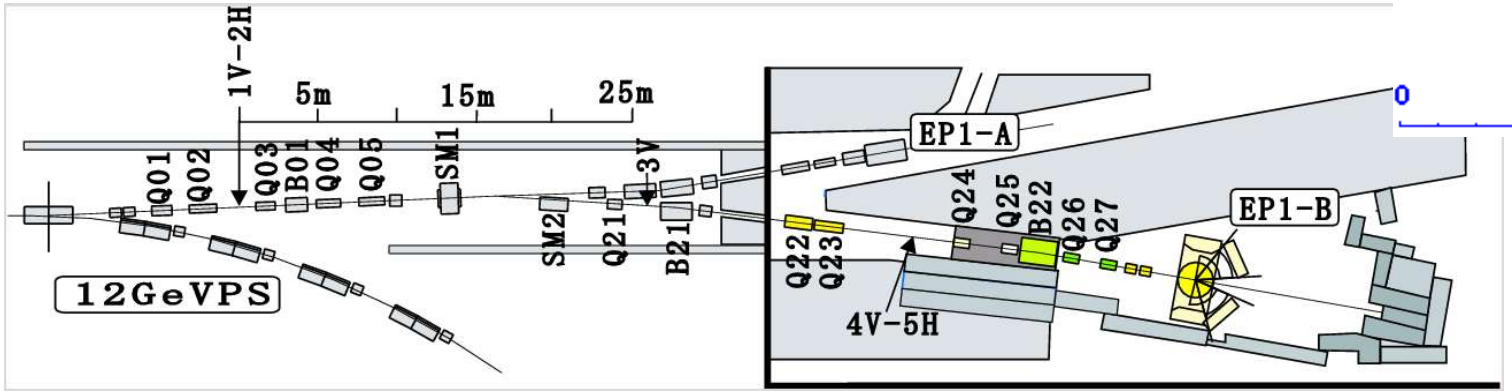




KEK-PS EP1B Beamline

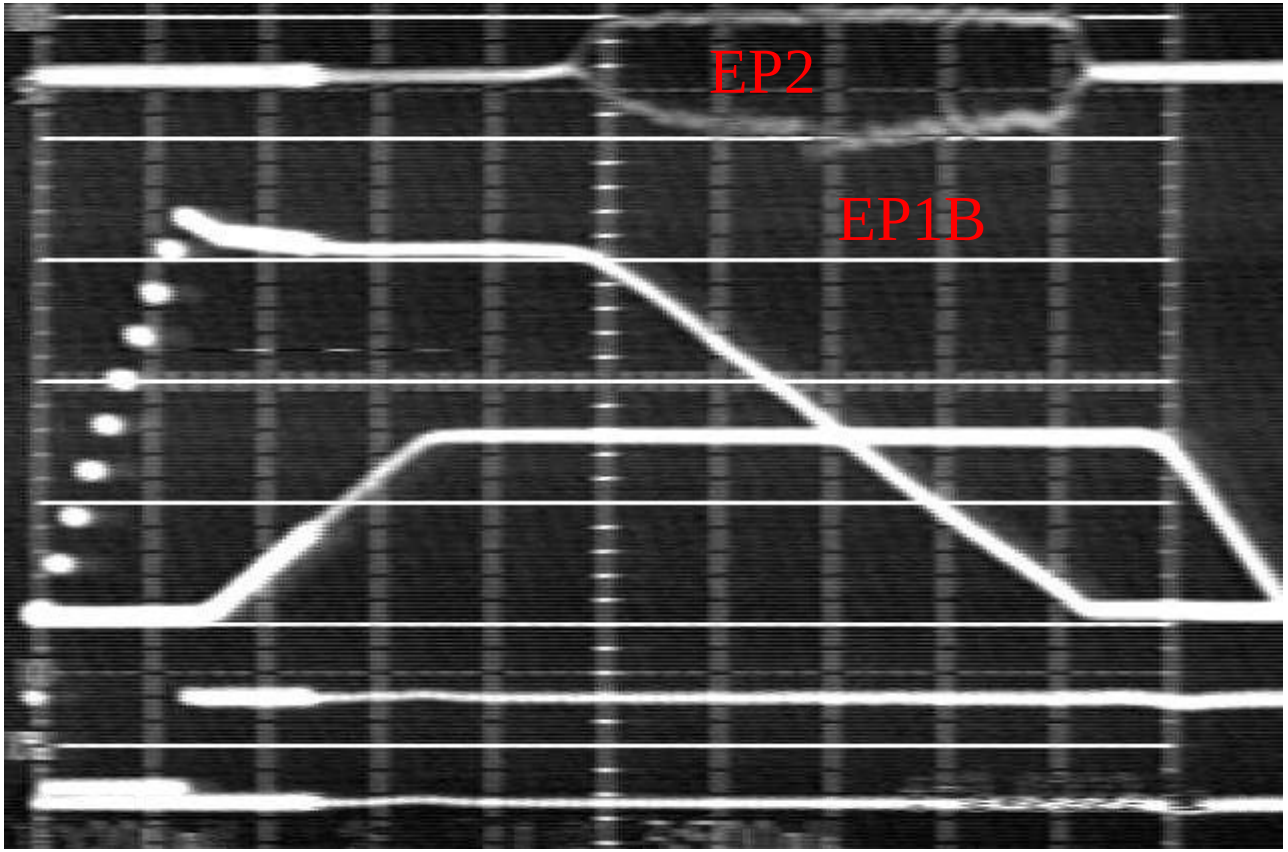
- constructed in North CH
  - E337 (1995-96)
  - E325 (1996-2002)





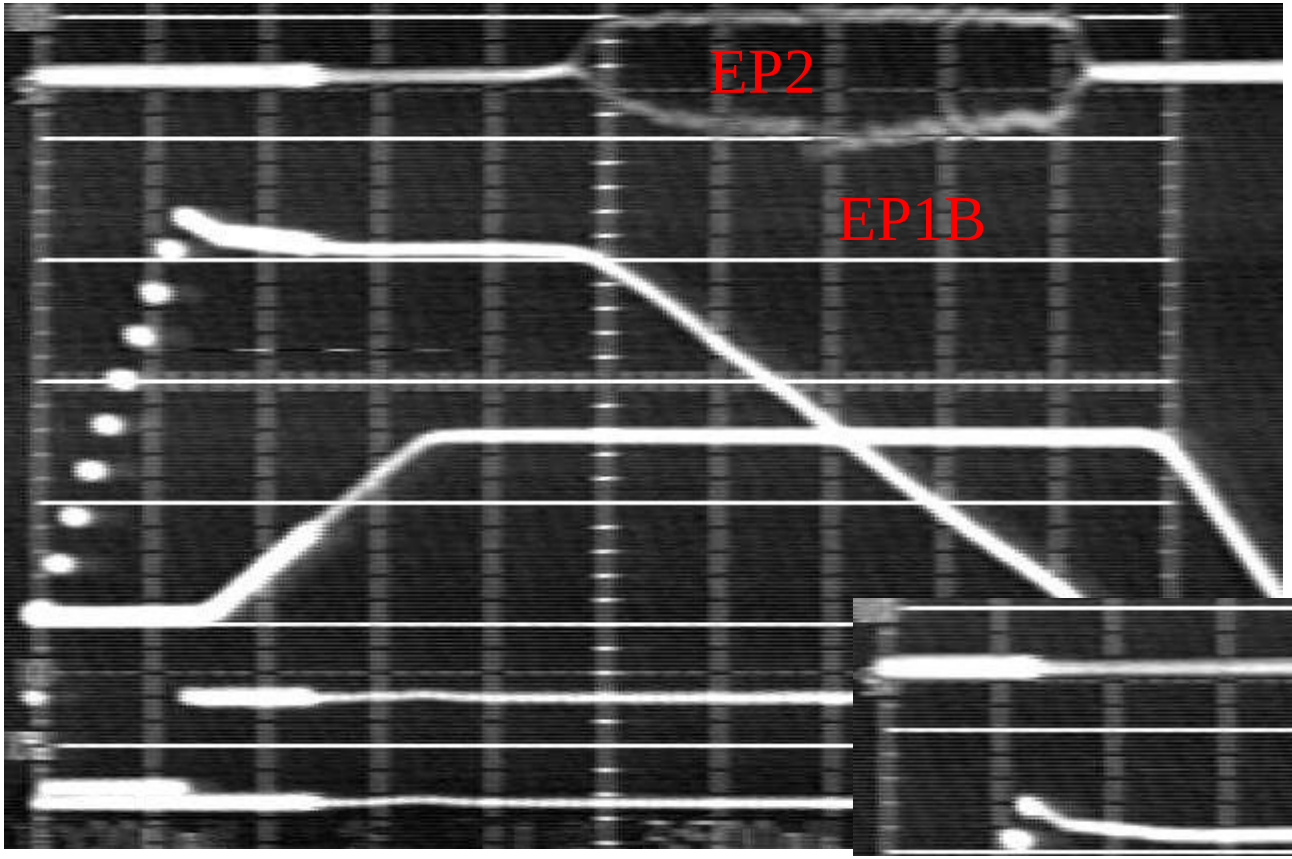
- double slow extraction
  - EP1B : EP2 = ~ 1:100 ... ~$1x10^{10}$ /spill
- upto $4x10^{9}$ /spill of primary beam (12 GeVproton)
  - intensity was controlled by the collimator 1V
  - collimators 2H~5H were used for the halo reduction
  - ~$1x10^{9}$ /spill was used in E325

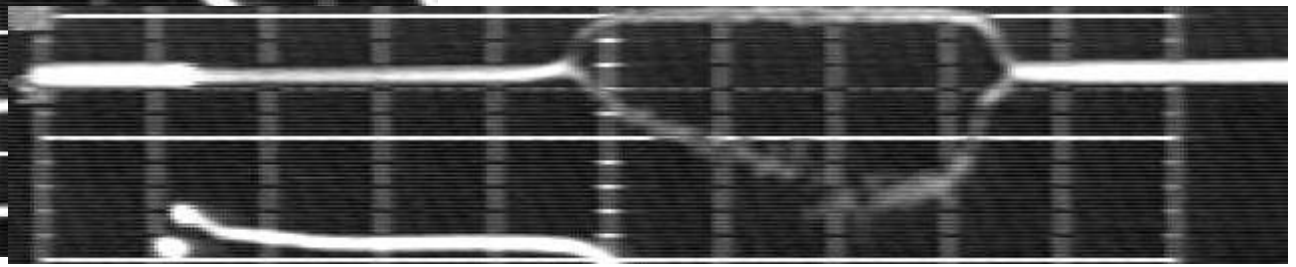
KEK-PS EP1B spill stability

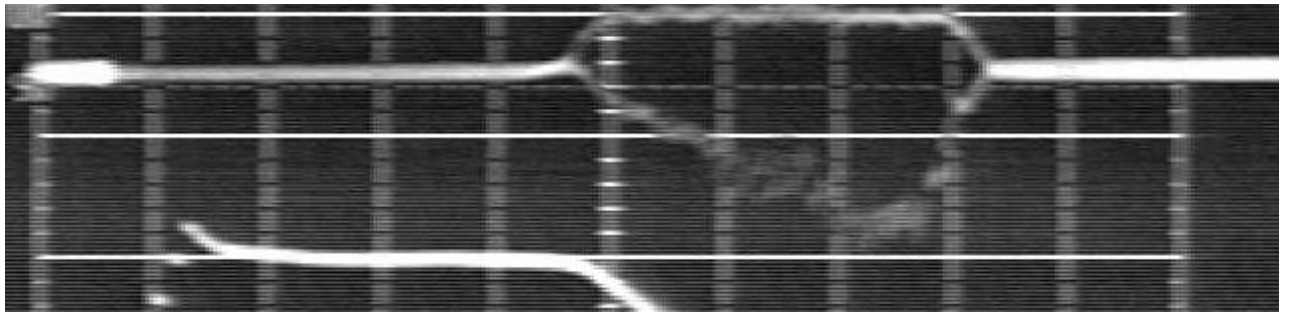


- spill by spill
- long term

KEK-PS EP1B spill stability







- spill by spill : x2~5
- long term : x2 in 2-3 hrs

Summary

- Vector meson measurements in e^+e^- channel at J-PARC
  - to investigate the chiral symmetry in dense hadronic matter
- 30 or 50 GeV primary proton beam (~$1x10^{10}$ /sec)
  - on thin targets (~0.1% int.length) to reduce electron background
  - especially collect ~10^5 $\phi \rightarrow e^+e^-$ in p+A reaction in 100 shift (~5weeks) operation (100 times as large as E325's statistics)
-
- Beam quality : as same as EP1B
  - spot size, beam halo, ...
  - beam halo
    - intensity x 10^-4/mm(W) at 20mm from beam axis
    - x 10^-5/mm(W) at 40mm