

# Parallel Session Summary

## BLT : Beam line, Tagger

1. meson beams
2. beam dump ( $e^-$  beam)
3. tagger design, price

### 1. meson beams : possibilities in Hall D

- \* complementary with  $\gamma$ -production
- \* compatible with above-ground production

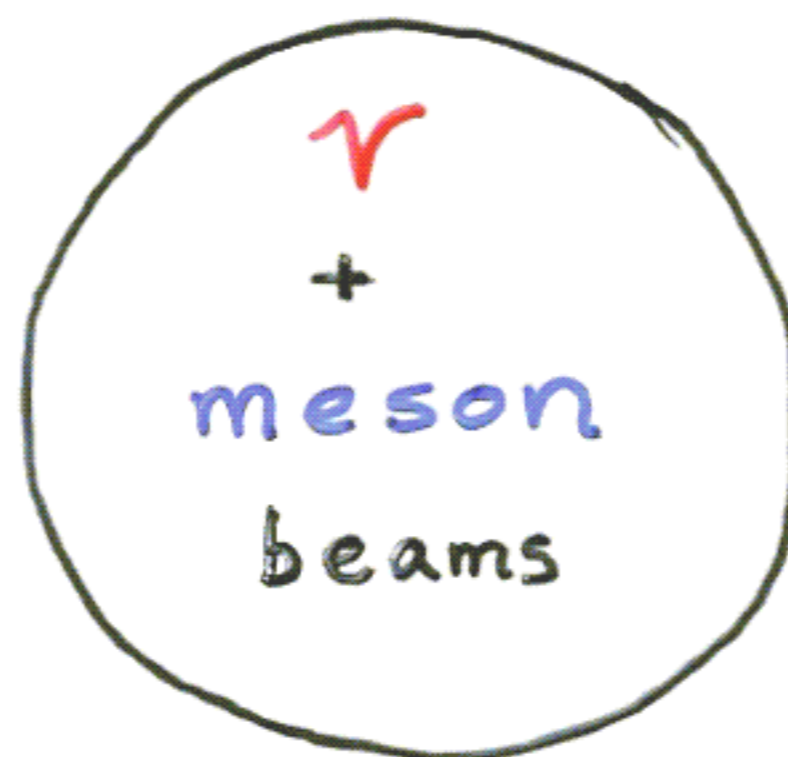
$$1\mu A @ 12 GeV \rightarrow 2 \text{ rad. len. Be}$$

$$\longleftrightarrow 10^{10} \text{ had. int. /s} > 6 GeV E_{tot}$$

- \* more interesting still at 24 GeV

### Physics

$\left\{ \begin{array}{l} \gamma (\rho, \omega, \phi \dots) \\ \pi \\ K \\ p \end{array} \right. ?$



one facility,  
multiple beams

### Detector

$\gamma$ -production  
most demanding

### Civil

flexible beam dump  
 $\Rightarrow$  above ground

## Ideas for the Hall D Tagger

### Requirements:

$E_0 = 12 \text{ GeV}$  (upgradable?)

Tag from 0.95 to 0.5  $E_0$  @ 12 GeV

Distance from radiator to hadron detector = 60 m

maybe more  
to allow for  
meson beam  
insertion

### Concept:

Keep magnet size comparable to Hall B Tagger:

Length  $\approx 6 \text{ m}$ , weight  $\approx 80 \text{ tons}$

Costs and technology known

### Horizontal bend

Facilitates construction, shielding, upgrades

Magnet length sufficient to tag down to 0.5  $E_0$

Need additional deflection of full-energy electrons

### Energy upgradability

Operate tagging spectrometer at low field ( $\approx 1 \text{ T}$ )

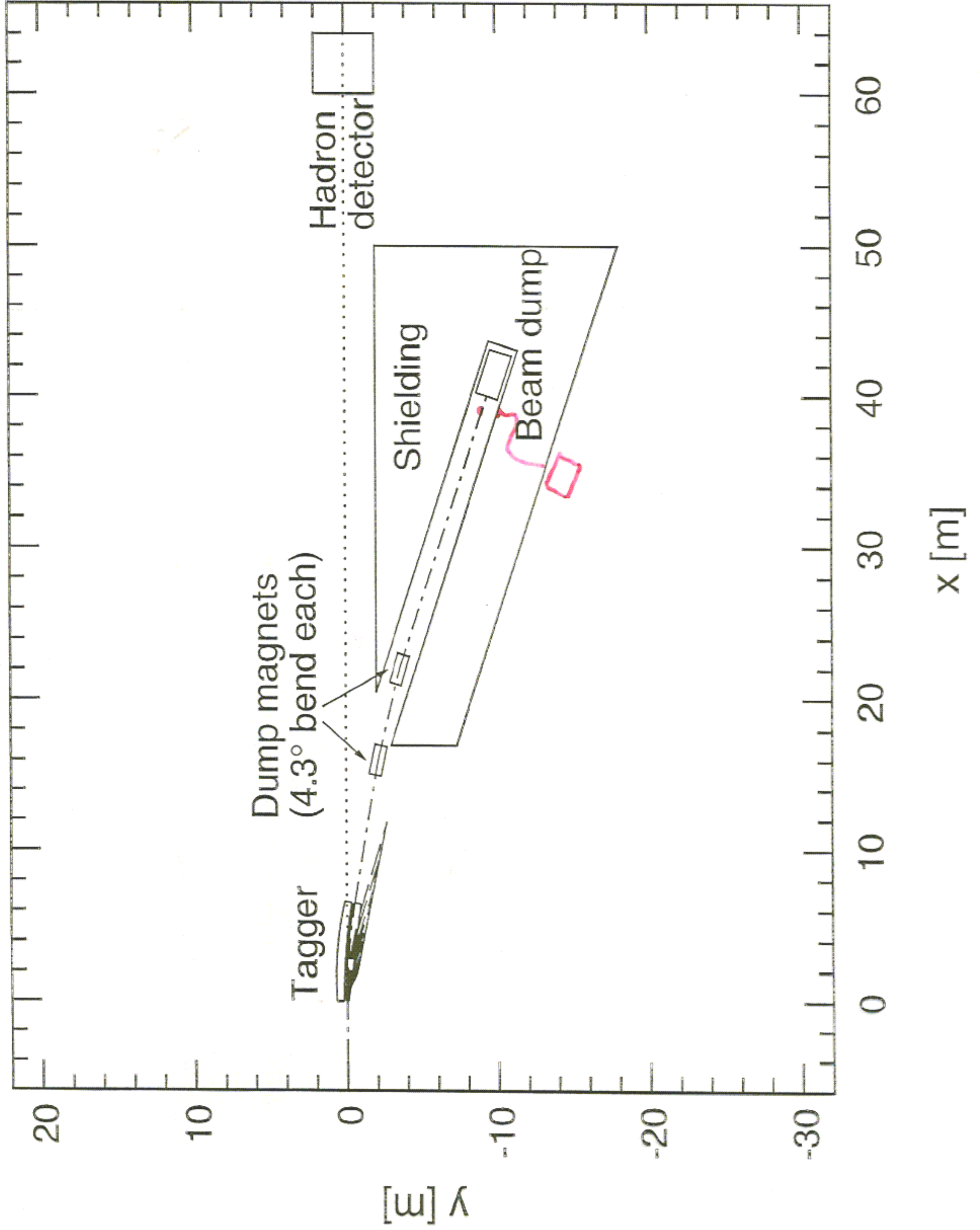
Design pole and/or yoke for alternate exit paths?

Add more magnets to dump line as needed



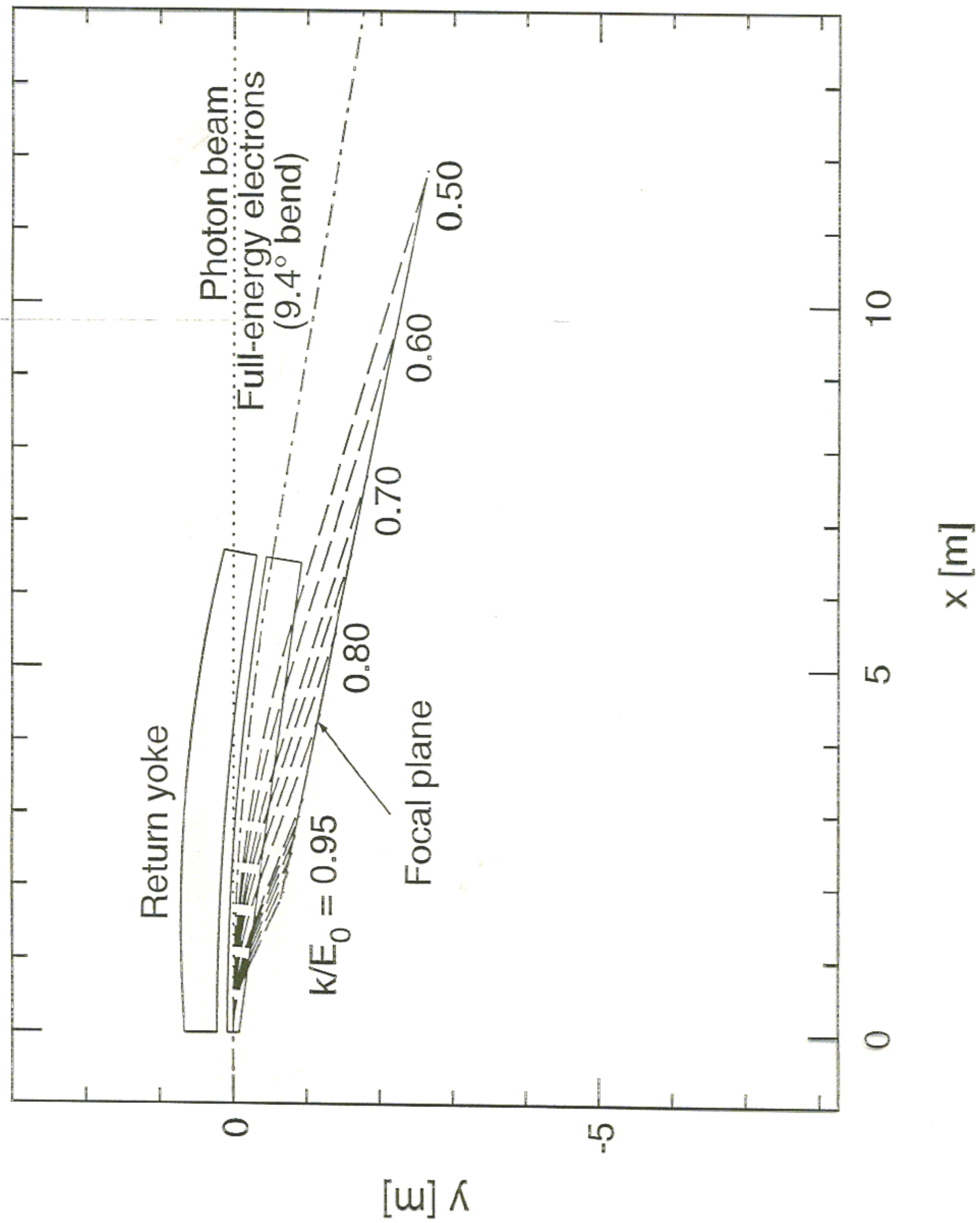
## 2. beam dump

Hall D Tagger and Beam Dump concept - plan view



### 3. *Tagger*

Hall D Tagger concept - plan view



## Hall D Tagger - Pre-Conceptual Design

Incident energy: 12 GeV (possible upgrade to 18 GeV)

Magnetic field:  $B = 1.0 \text{ T}$  at 12 GeV

Tagging range: photons from 50% to 95% of  $E_0$

Deflection angle of full-energy electrons:

9.4° in tagger magnet, 8.8° after tagger magnet

Deflection angle of detected electrons:

25° at 0.95  $E_0$ , decreasing to 16° at 0.50  $E_0$

Magnet dimensions:

Length = 6.5 m, weight = 80 tons



## Hall D Tagger - Pre-Conceptual Design

Approximate costs: (estimated from Hall B, 1991-1993)

### Tagger magnet:

iron and machining	\$250K	
coils	\$150K	
power supply	\$100K	
vacuum chamber, etc.	\$150K	
Total		\$650K

### Beam line to tagger dump:

2 magnets (BL  $\approx$  2 T-m) and power supplies  
Probably available from surplus

\$100-300K

### Hodoscope:

90 channels ( $\Delta k \approx 0.005 E_0$ )

scintillator	\$100	
PMT + base	\$300	
discriminator	\$100	
TDC	\$100	
Total	= \$600/channel =	\$60K

---

1 M \$

BDG : Buildings, layout of beamline  
for Hall D

1. Tagger building
2. Photon beam tube
3. Detector building + control room