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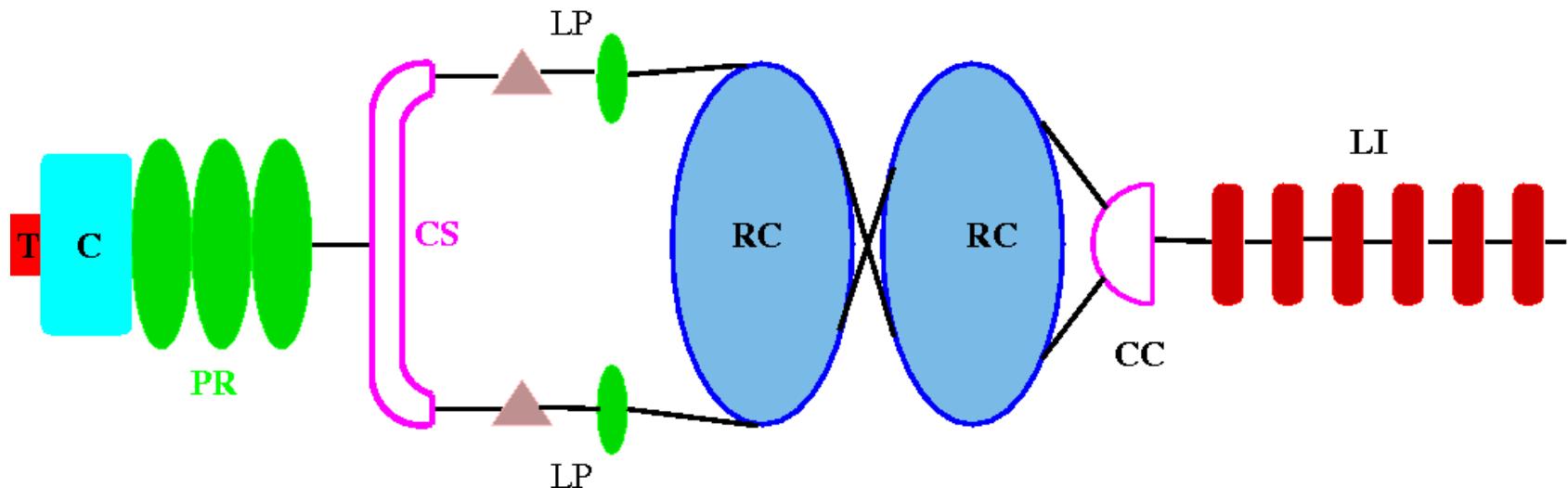
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# Charge separation

R.C. Fernow & J.C. Gallardo  
MC Friday Meeting  
25 February 2005

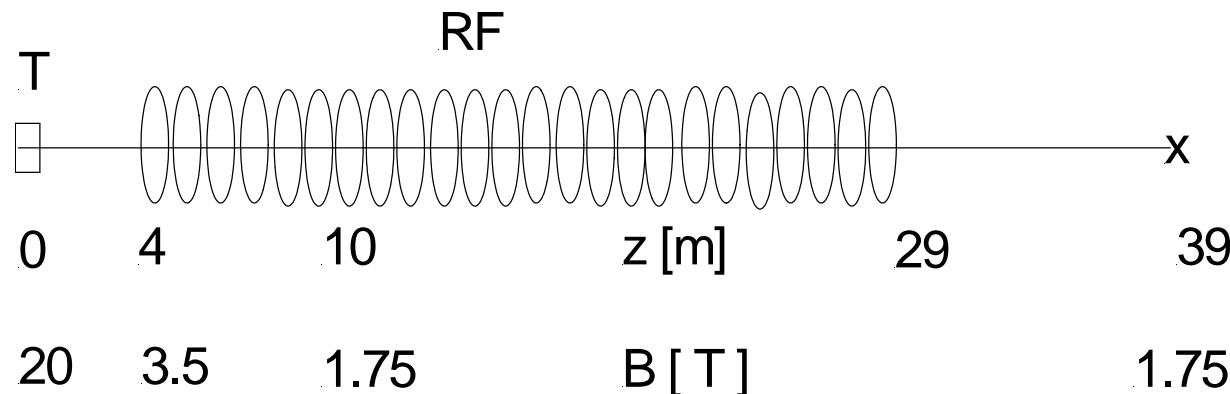
# Possible layout

- look at scheme that uses ring coolers



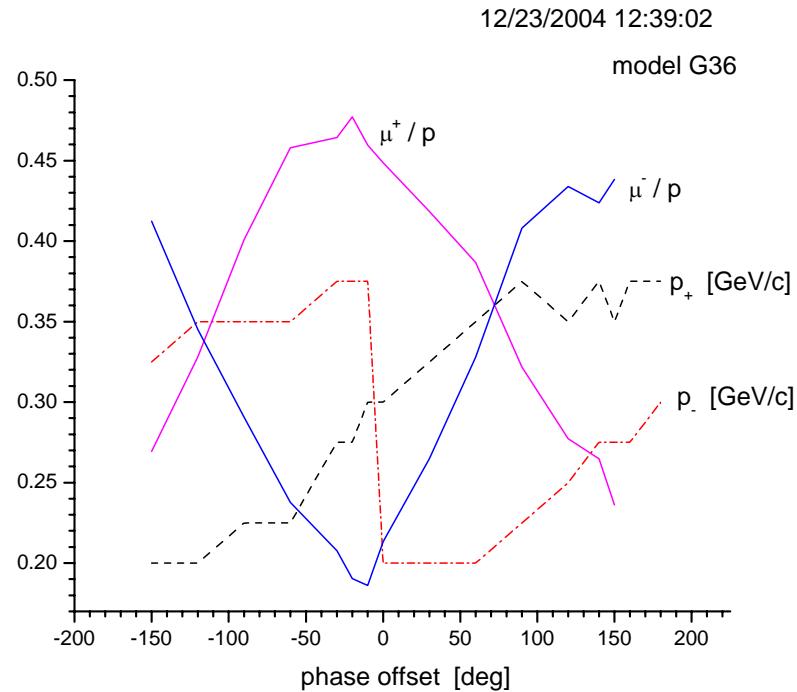
# Phase rotation

- use simple Balbekov-like 40 MHz channel
- $G = 6 \text{ MV/m}$



# Phase scan

- want equal number of + and – particles
- but particles have different momenta



# Requirements

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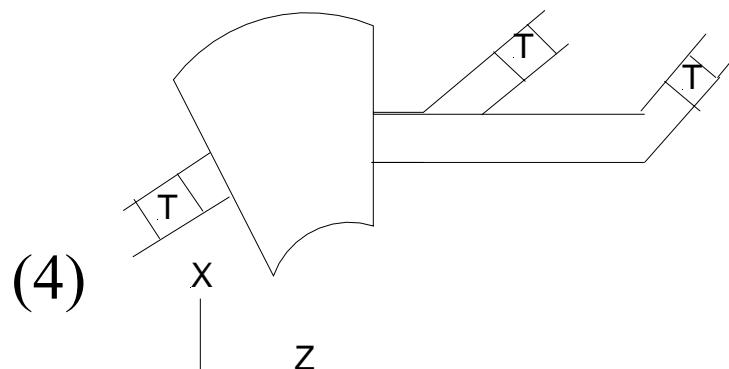
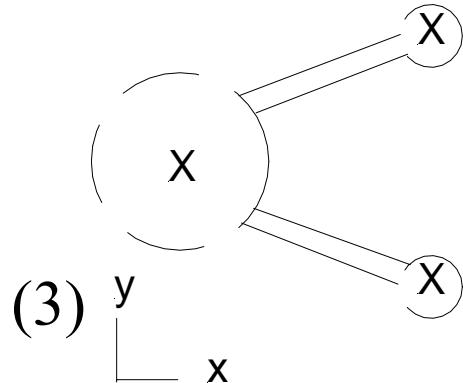
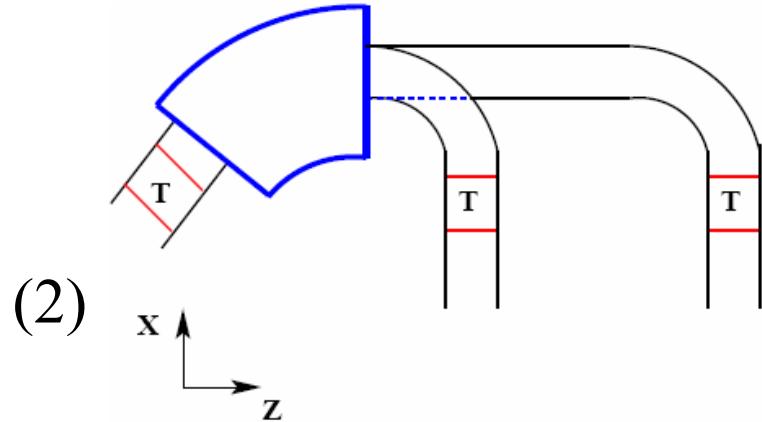
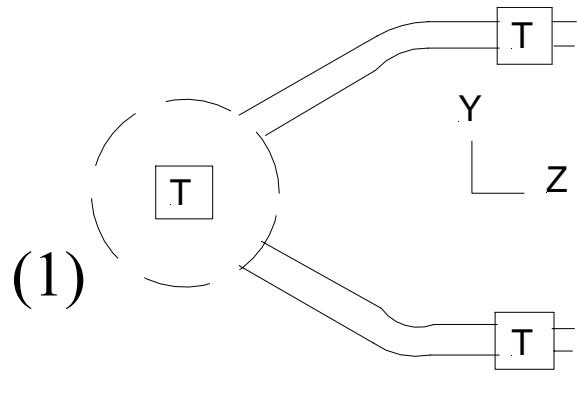
- clean separation by charge
- into two parallel channels
- roughly in plane parallel to surface
- 5 m apart

Figure of merit

- longitudinal phase space box
- $\Delta z = 6 \text{ m}$
- $\Delta p = 200 \text{ MeV/c}$

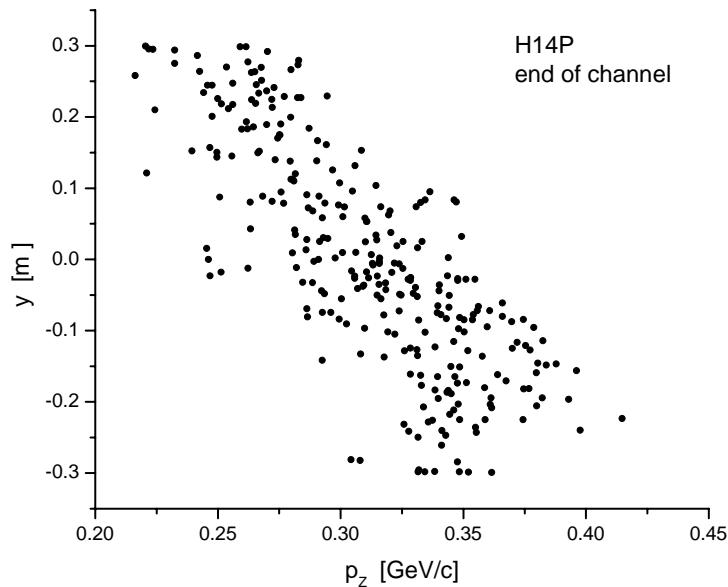
# Configurations

- look at different bent solenoid configurations
- T: 1.75 to 3 T transitions for better acceptance



# Dispersion

- bent solenoid generates dispersion
- if not careful, still present at end of transport, e.g (1) and (2)
- must choose second bend in same plane with opposite polarity  
e.g. (3) and (4) remove dispersion



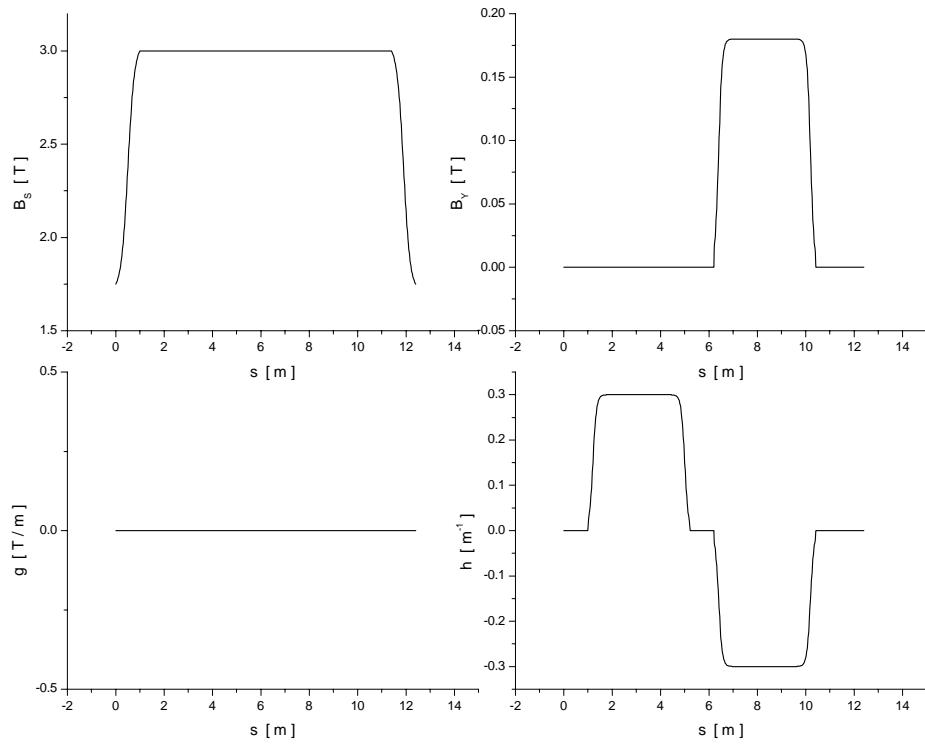
# Hard-edge survey summary



conf	symm	Q	$\langle p \rangle$	TR <sub>BOX</sub>
1	H V	+	320	0.291
		-	205	0.288
2	H H'	+	314	0.250
		-	207	0.249
3	H -H	+	325	0.296
		-	204	0.284
4	H -H	+	326	0.328
		-	201	0.320

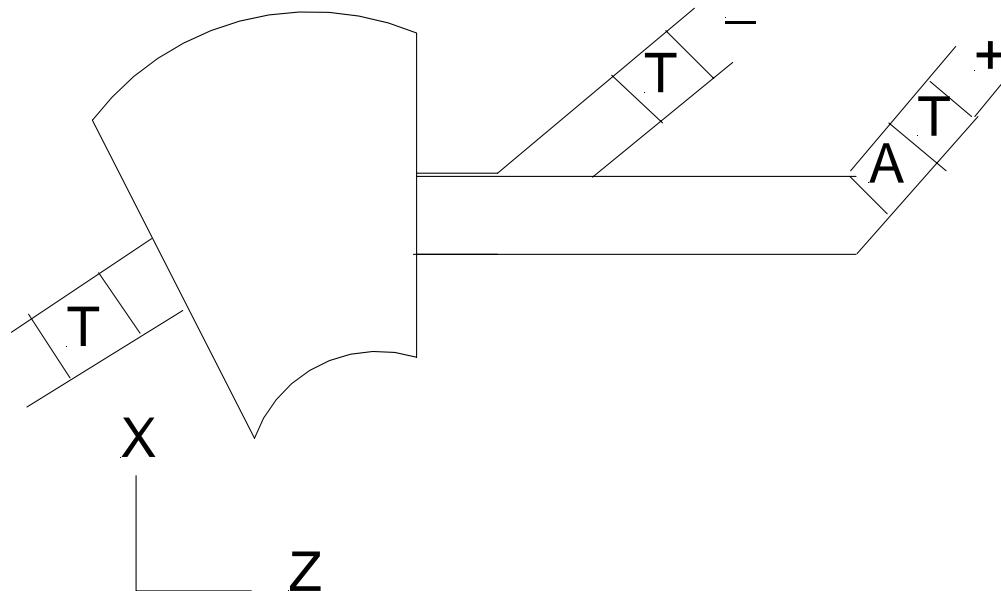
# Realistic ICOOL model

- add decay and absorber
- specify field components on-axis
- fit to polynomials, analytic derivatives for off-axis fields



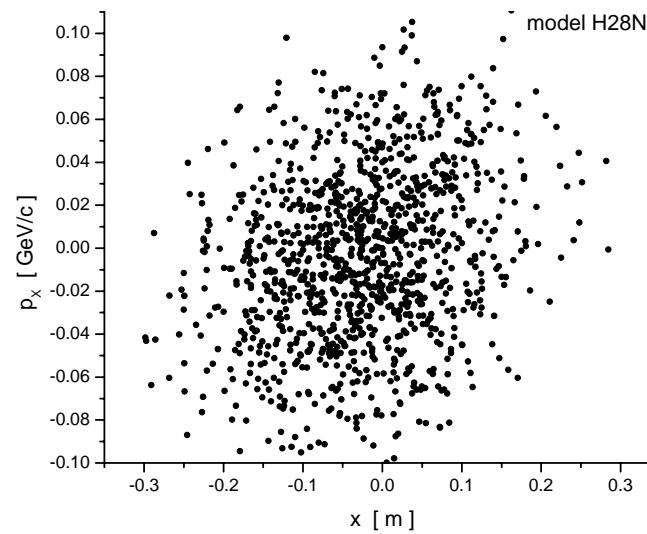
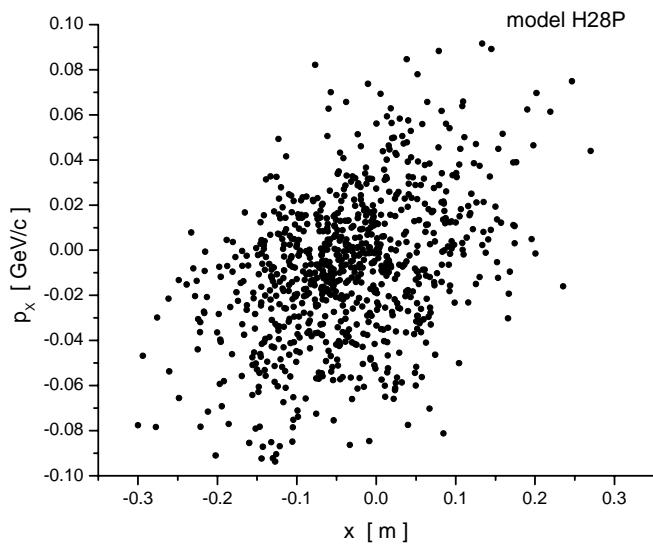
# Final configuration

- A: use 75 cm LiH absorber to match momenta
- use same geometric curvature for both beams



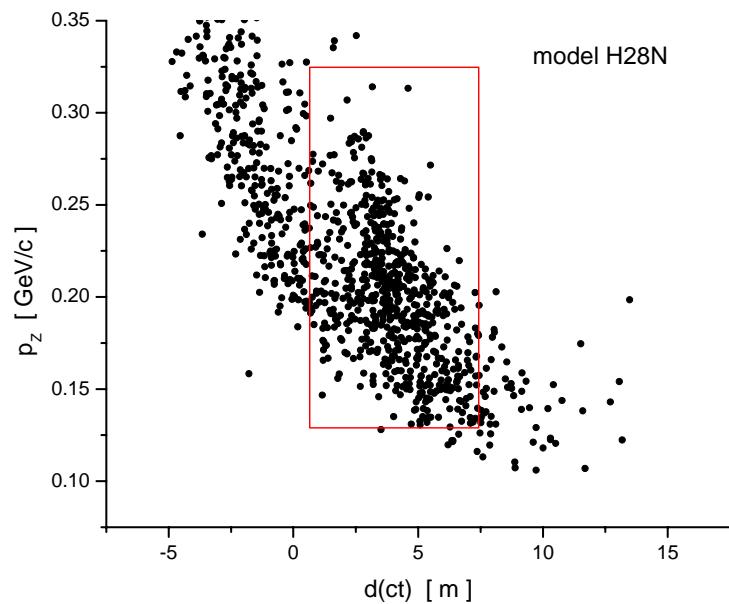
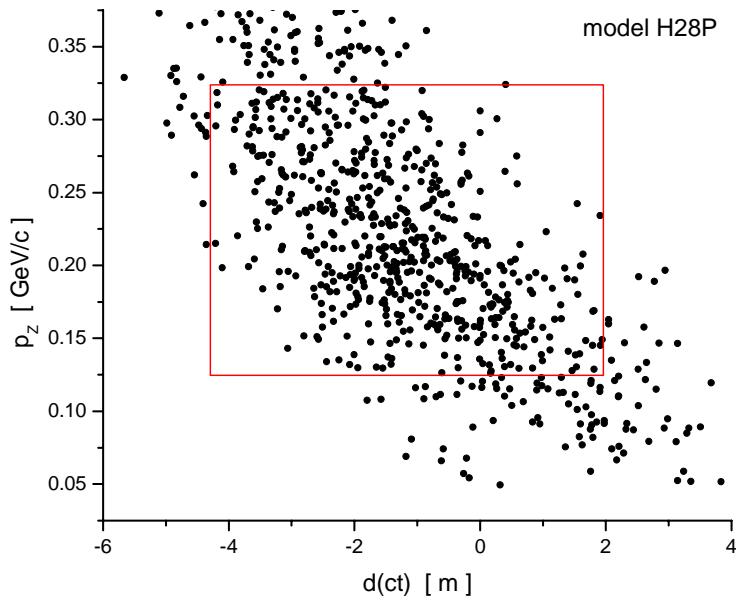
# Transverse phase space

- transverse phase space is similar for the two lines



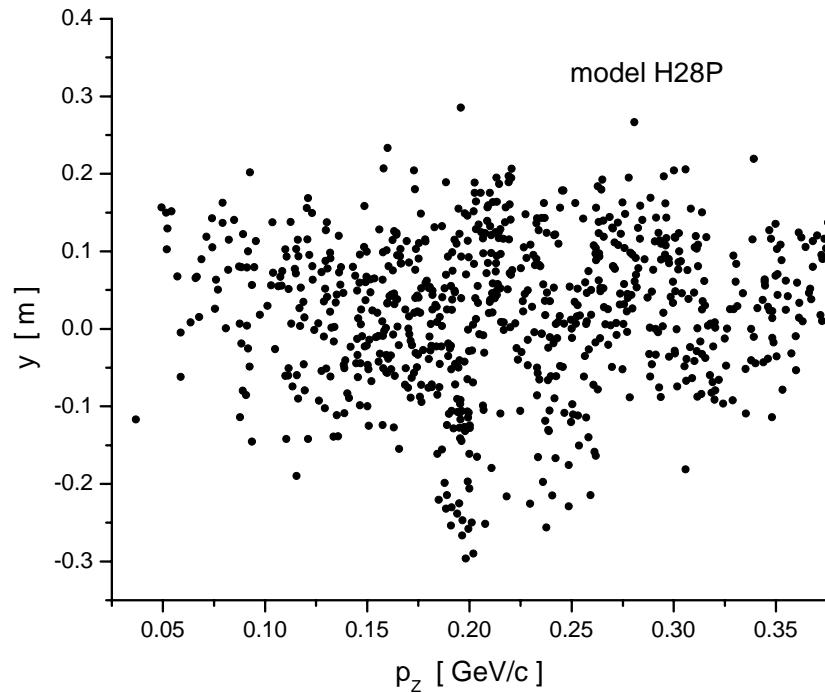
# Longitudinal phase space

- boxes enclose useful beam



# Dispersion

- dispersion is removed



# Losses

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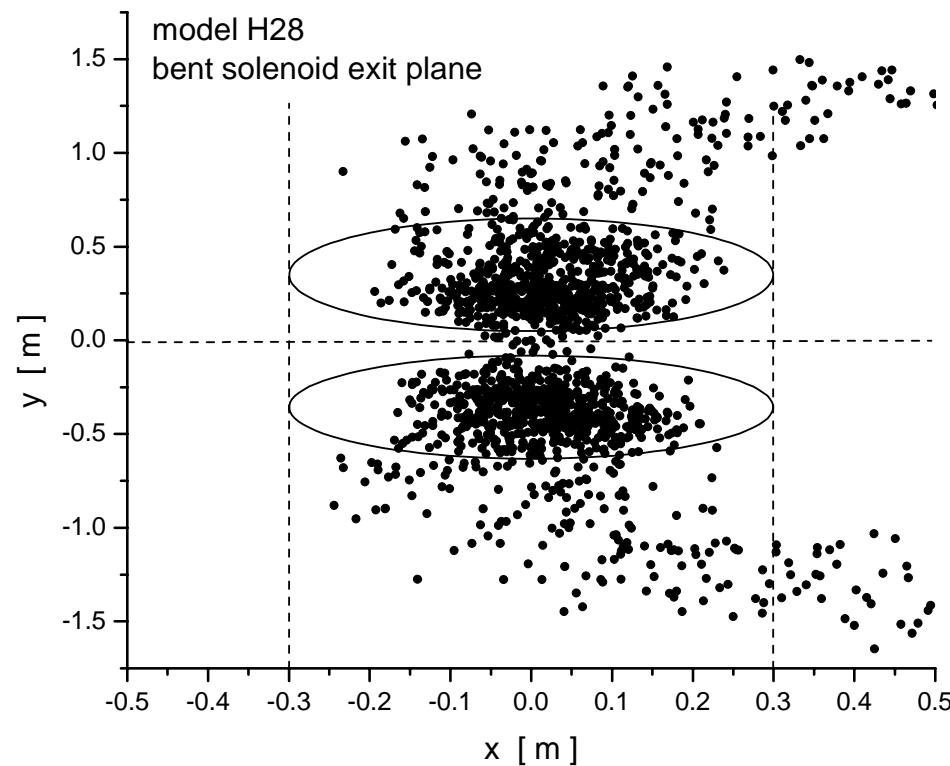


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	+		-	
loc	TR	TR <sub>BOX</sub>	TR	TR <sub>BOX</sub>
start	1.000	0.381	1.000	0.405
BS hole	0.893	0.365	0.900	0.366
straight	0.517	0.324	0.610	0.344
2 <sup>nd</sup> BS	0.506	0.319	0.583	0.314
end	0.416	0.285	0.576	0.305

# Bent solenoid exit plane

- small loss from tails on exit face



# Summary

$Q$	$\epsilon_{TN}$ [ mm ]	$\epsilon_{LN}$ [ mm ]	$\langle p \rangle$ [MeV/c]	$\mu / p$
+	21	420	204	0.274
-	23	380	205	0.283