

# LiH plate Pre-Cooler

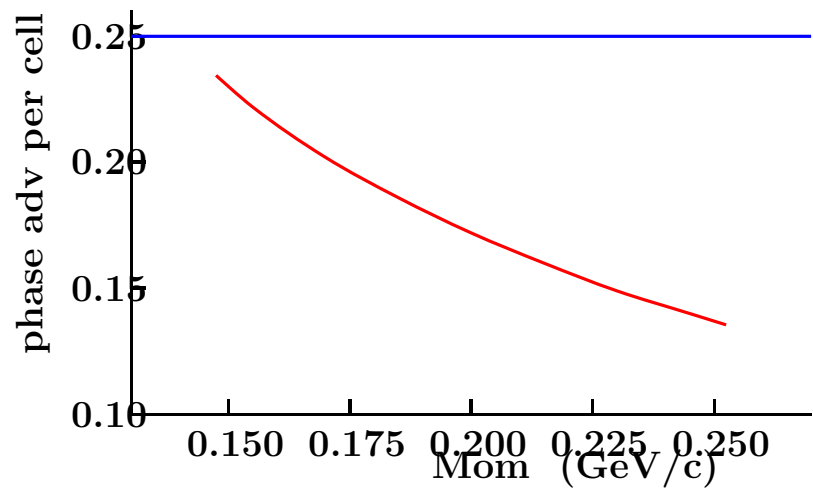
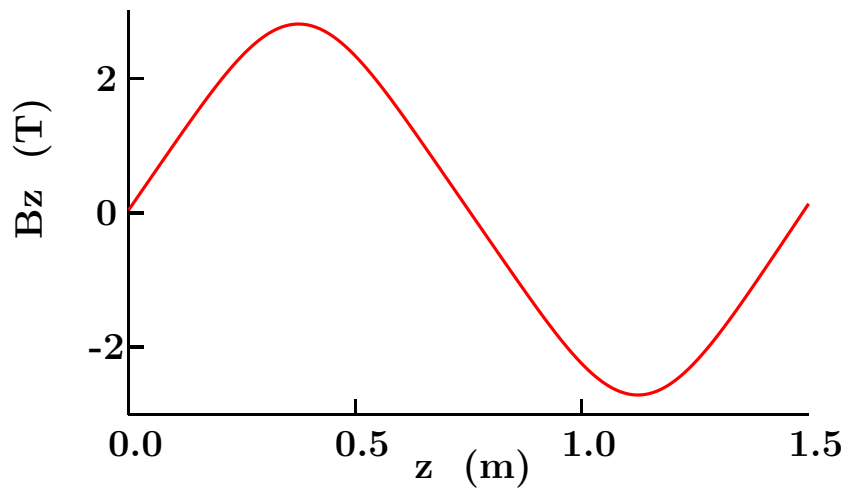
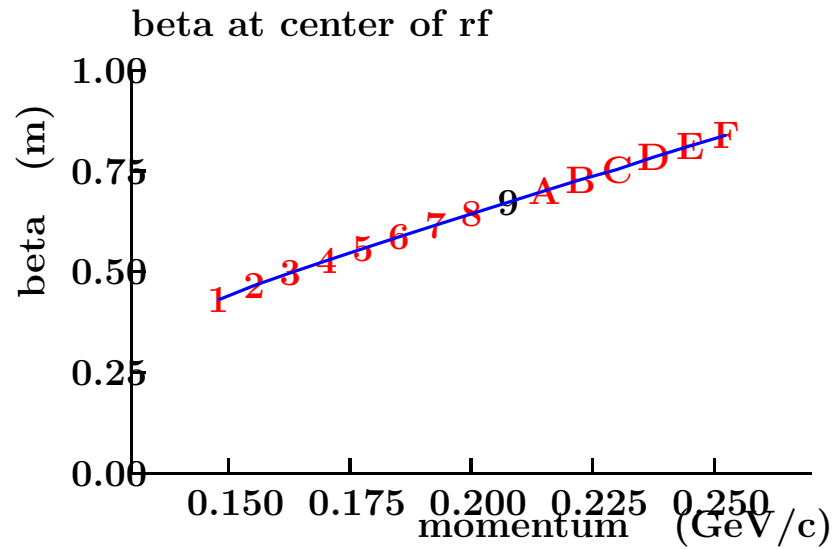
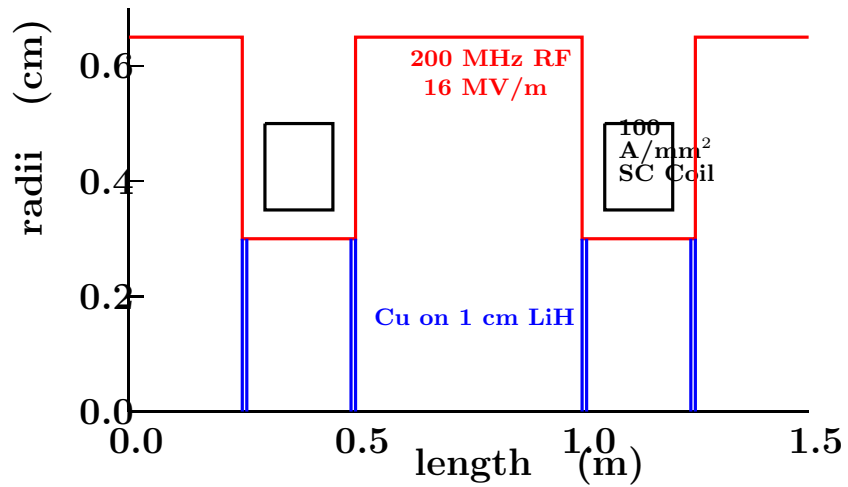
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The pre cooler should accept the full emittance transmitted from the capture solenoid (approx 160 pi mm).

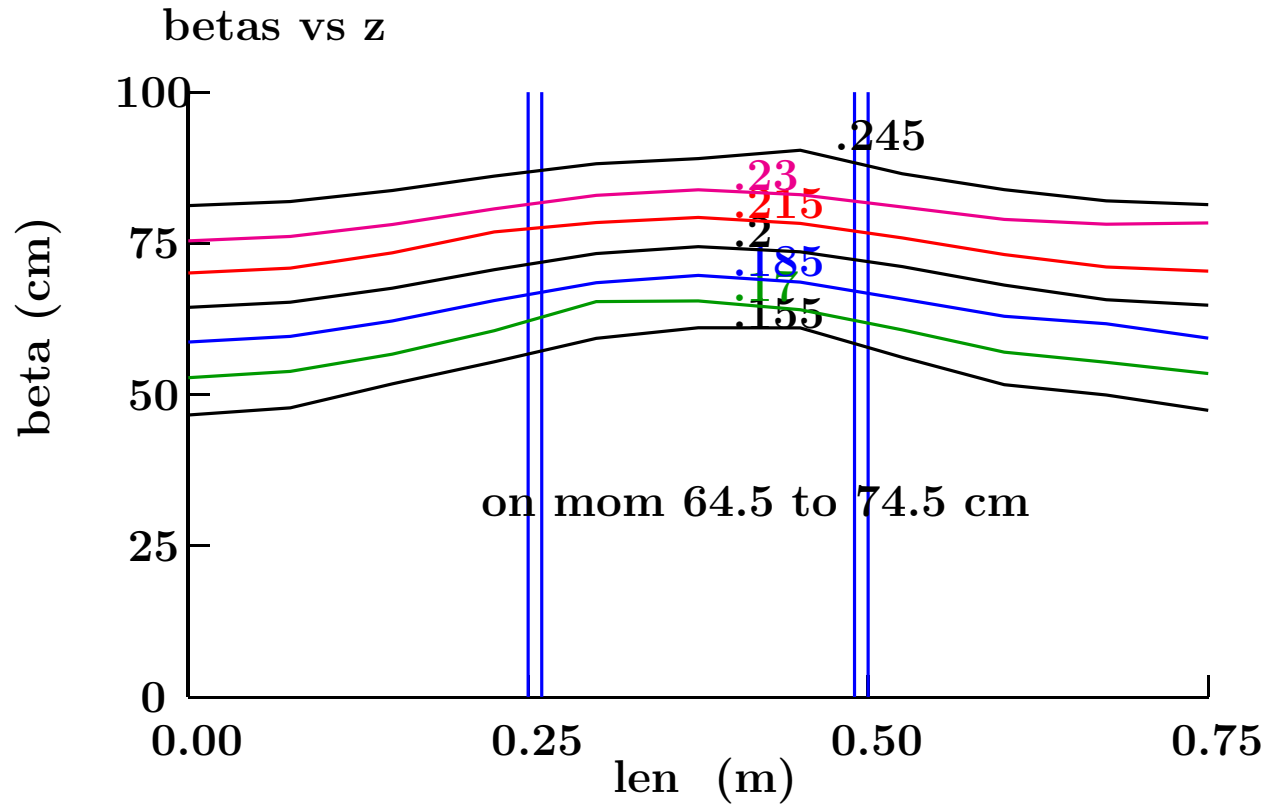
This channel has an acceptance of 230 mm at 200 MeV/c.

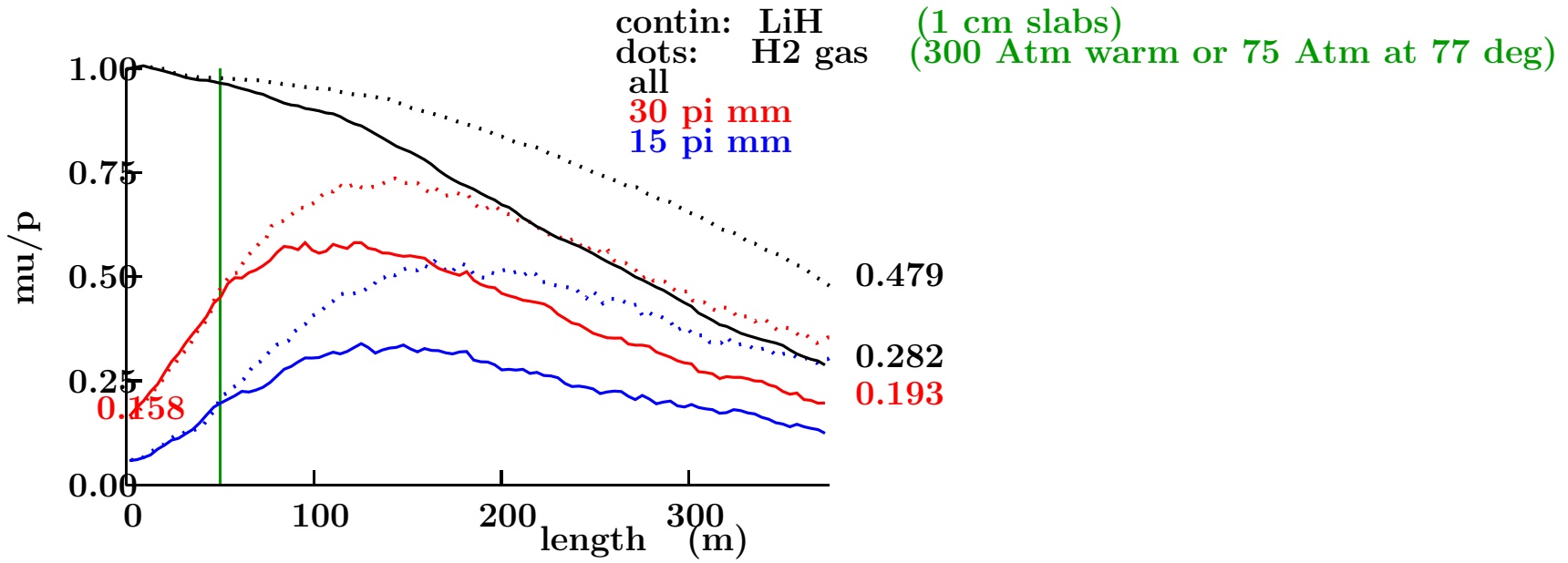
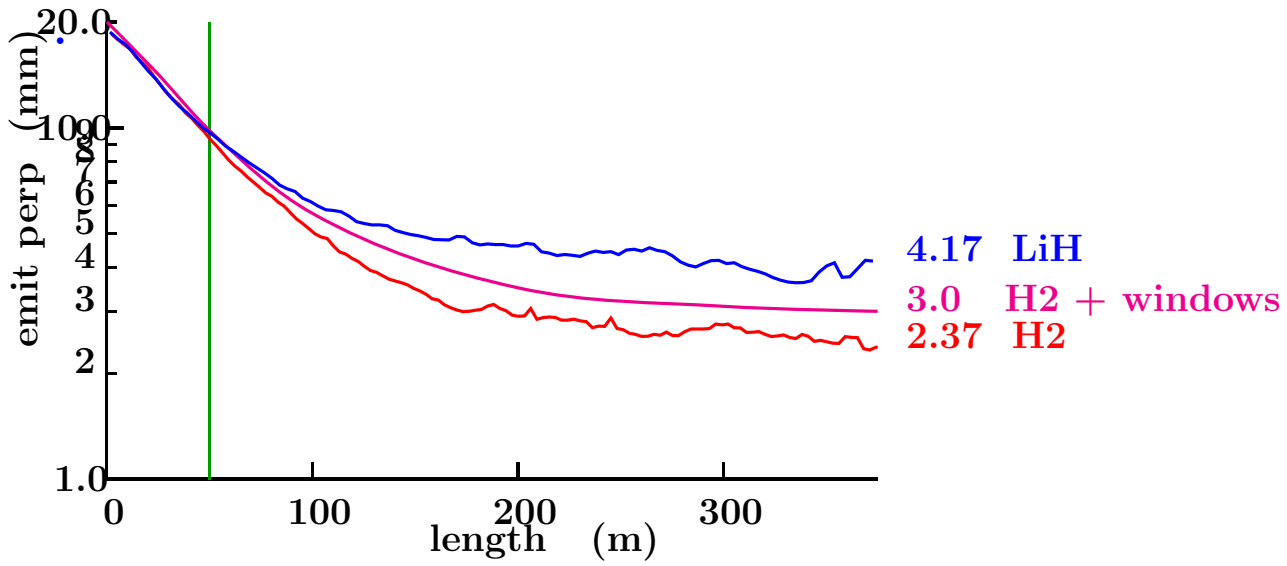
This study uses the same lattice designed for a hydrogen filled pre-cooler, but uses LiH plates instead of high pressure H<sub>2</sub>.



len1	gap	dl	rad	dr	I/A	n I	n I l
m	m	m	m	m	A/mm <sup>2</sup>	A	A m
0.300	0.300	0.150	0.350	0.150	106.67	2.40	6.41

RF gradient	MV/m	16
H2 gas pressure	atm	300





## Conclusions

- 50 m channel gives increase in muons captures:
  - 3.5 into 15 pi mm
  - 3.0 into 30 pi mm
- negligible difference between LiH and H<sub>2</sub> gas

## To Do

- Match and run with Neuffer Buncher **tomorrow**
- Add bending **Now**
  - Try with H<sub>2</sub> gas (path difs may give exchange) **not yet**
  - give LiH wedge angles **now**

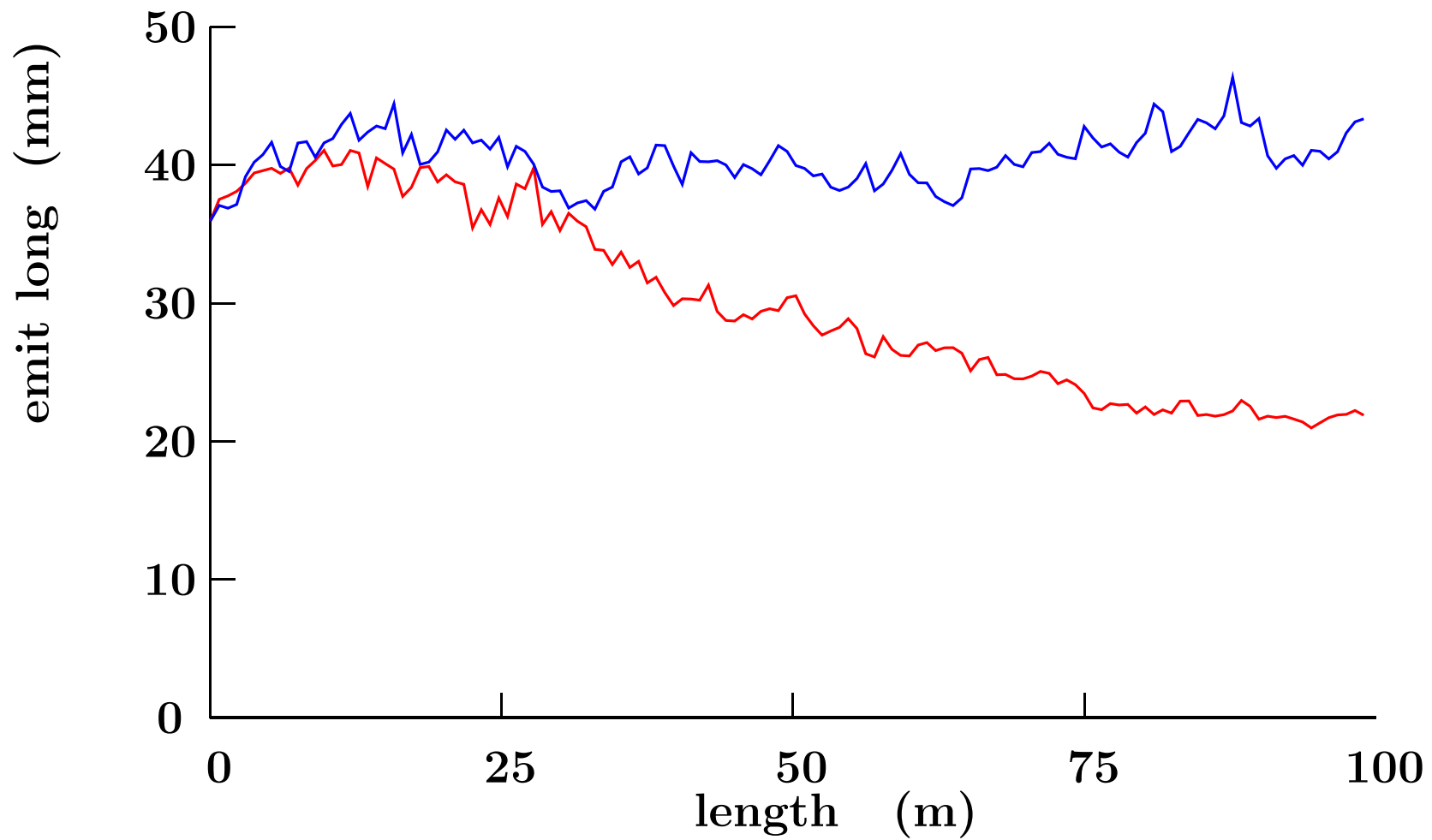
## Adding Bending Field

- Fourier analyse  $B_z$  vs.  $z$  in straight channel
- Add fixed 0.1 T Bending field (40 m circ.)  
Method ignores radial fields from solenoids in bend  
But for RFOFO, these did not hurt performance when included.
- Dispersion at LiH plates is vertical 6 cm
- Replace 1 cm LiH plates by 3.8 degree vertical wedges with apexes 15 cm above axis

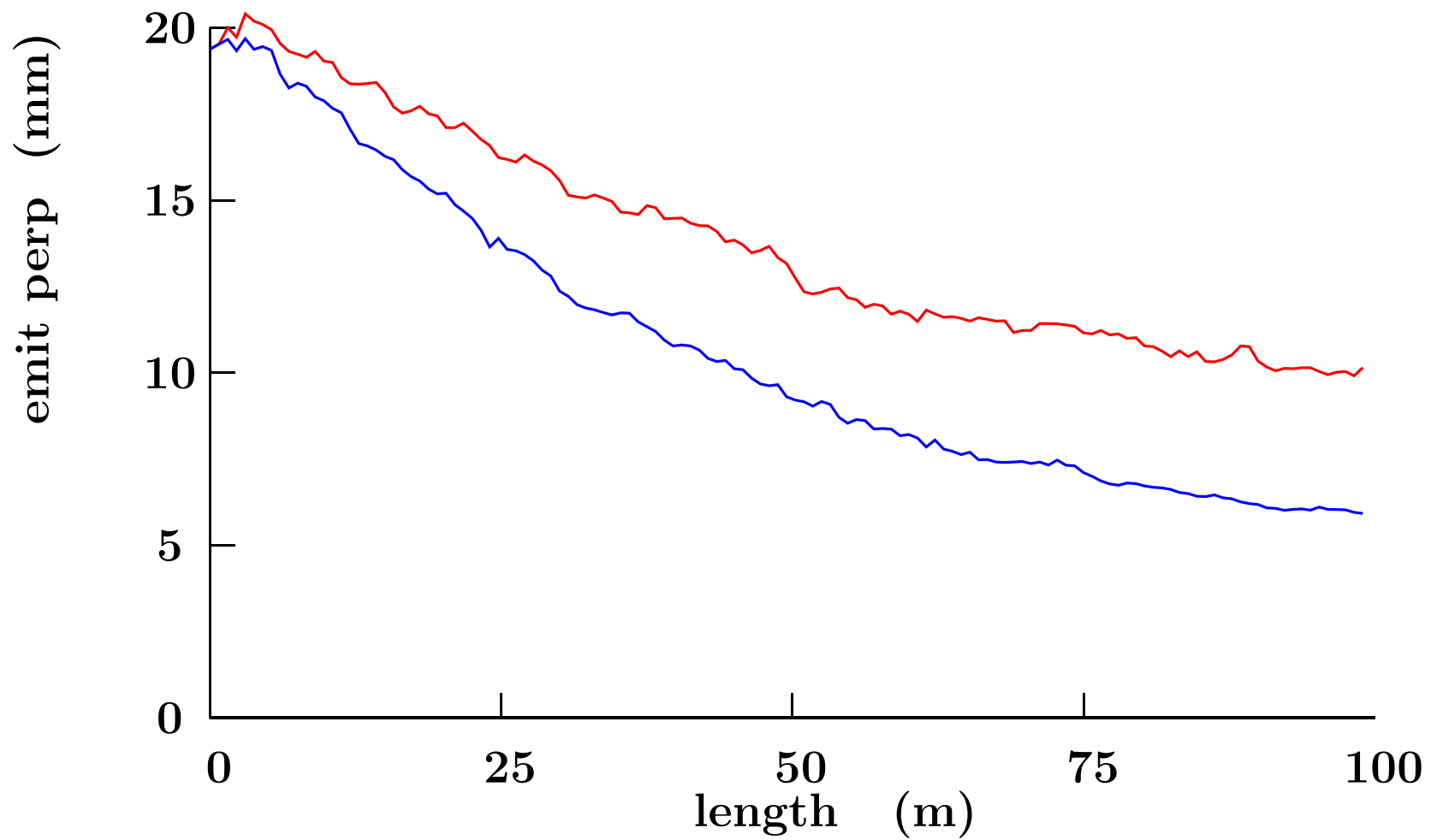
In the following plots

Blue are for Linear Channel

Red are for curved Channel

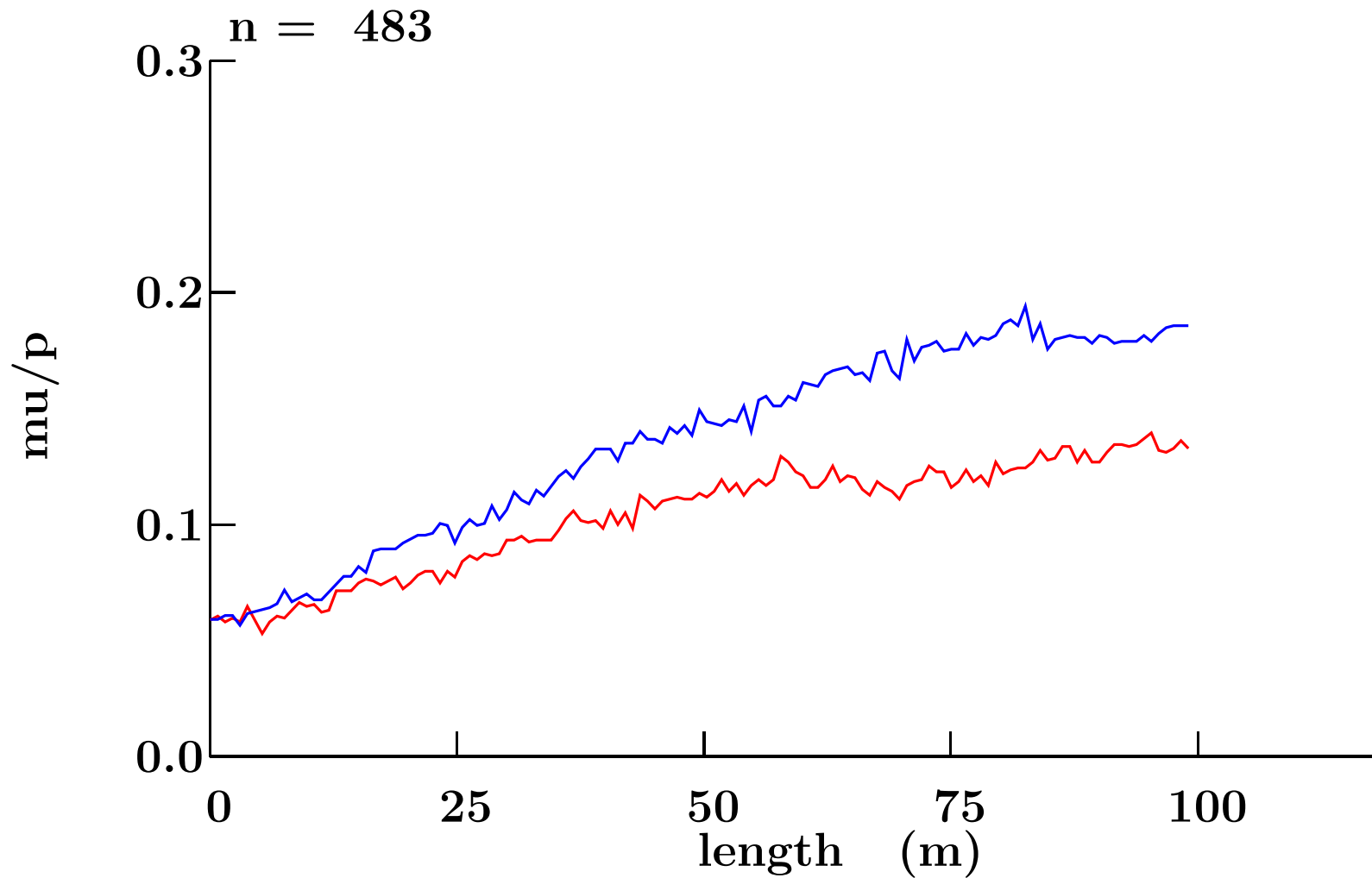


**Longitudinal Cooling is observed**



**But Transverse cooling is hurt**





Values of  $\mu/p$  are not absolute and good for comparison only  
**Net muon capture is less**

## Summary

	linear	curved
<b>initial</b>		
trans (pi mm)	10.4	10.4
long (pi mm)	34.0	34.0
6 D (pi mm) <sup>3</sup>	13.5 k	13.5 k
<b>50 m</b>		
trans (pi mm)	9.2 (1/2.1)	12.7 (1/1.5)
long (pi mm)	39.9 (1/.9)	30.5 (1/1.2)
6 D (pi mm) <sup>3</sup>	3.39 k (1/4.0)	4.9 k (1/2.7)
<b>100 m</b>		
trans (pi mm)	5.9 (1/3.3)	10.1 (1/1.9)
long (pi mm)	43.4 (1/.8)	21.9 (1/1.6)
6 D (pi mm) <sup>3</sup>	1.52 k (1/8.9)	2.3 k (1/5.9)