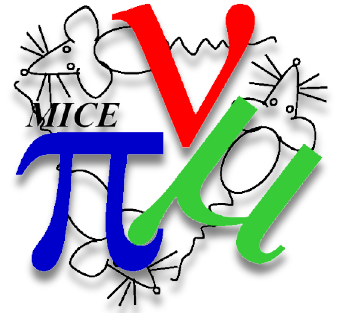
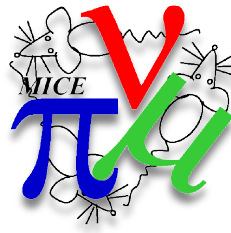


Multiple Coulomb Scattering in the MICE LH2 Absorber



- Optics tag Test1/Test2 difference
- Materials traversed TOF01- Absorber
 - (+) Path length in absorber calculation
- Monte Carlo PID estimate in selection used
- MAUS v-3.2.0 installs on SL, not on CENTOS

Data used



Data Used

User cycles 2017 – 09 -10 - 11

Optics : 3-170+M3-Test1, 3-240+M3-Test1 3-200+M3-Test2/Test1

Empty

Full

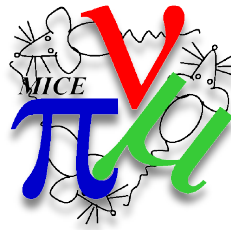
Test 1	Test 2	Test 1	Test 1
170	200	240	
10092	10093	10159	10189
10153	10156	10161	10190
10154	10157	10162	10199
10155	10158	10169	10200
10165	10164	10175	10201
10167	10168	10176	10208
10173	10182	10177	10209
10186	10183	10178	10210
10202	10203	10180	10211
	10207	10181	10159
	10093	10185	

Test 1	Test 1
170	240
09772	09773
09774	09776
09775	09779
09777	09855
09778	09856
09854	09857
09859	09858
09861	09860
09772	09773
	09935
	09936
	09937
	09938
	09939
	09940
	09941
	09942
	09943
	09944
	09935

- 200-Test 1 has 5A less than 200-Test 2 in D1

All Test 2 except run 09856

Materials TOF01 -> Absorber



Traversed material

Material	z(cm)
Helium (Tracker)	113
Aluminium (Tracker)	0.016
Air	897.16
SciFi	0.525
TOF1	?
LH2	->
HE (Absorber)	->
Aluminium (Absorber)	->

Vessel shape for LH2/He path length calculation

$$r = 5.009^{-6}x^5 - 0.0007x^4 + 0.034x^3 - 0.815x^2 + 10.867x. \quad [1]$$

Al vessel window thickness

$$h(r) = \begin{cases} \sqrt{142.45^2 - r^2} - 2.27 - \sqrt{140^2 - r^2} & r \leq 87.2 \\ \sqrt{102.08^2 - (r - 150)^2} - \sqrt{100.8^2 - (r - 149)^2} & r > 87.2 \end{cases} \quad [2]$$

Al safety window thickness

$$h(r) = \begin{cases} \sqrt{151.95^2 - r^2} - 2.41 - \sqrt{149.33^2 - r^2} & r \leq 92.3 \\ \sqrt{107.52^2 - (r - 158.93)^2} - \sqrt{108.88^2 - (r - 160)^2} & r > 92.3 \end{cases} \quad [2]$$

[1] J.C. Nugent (2016) "Multiple Coulomb Scattering in the MICE Experiment"

[2] R. Connors et. Al. (2014) "The Thickness Measurement of MICE Absorber Aluminum window at LBNL"

TOF01 Distributions

