MCS in LH2 (Field-off)

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- Aluminium thickness, taking the direction into account
- Selection
- LH2 path length calculation method

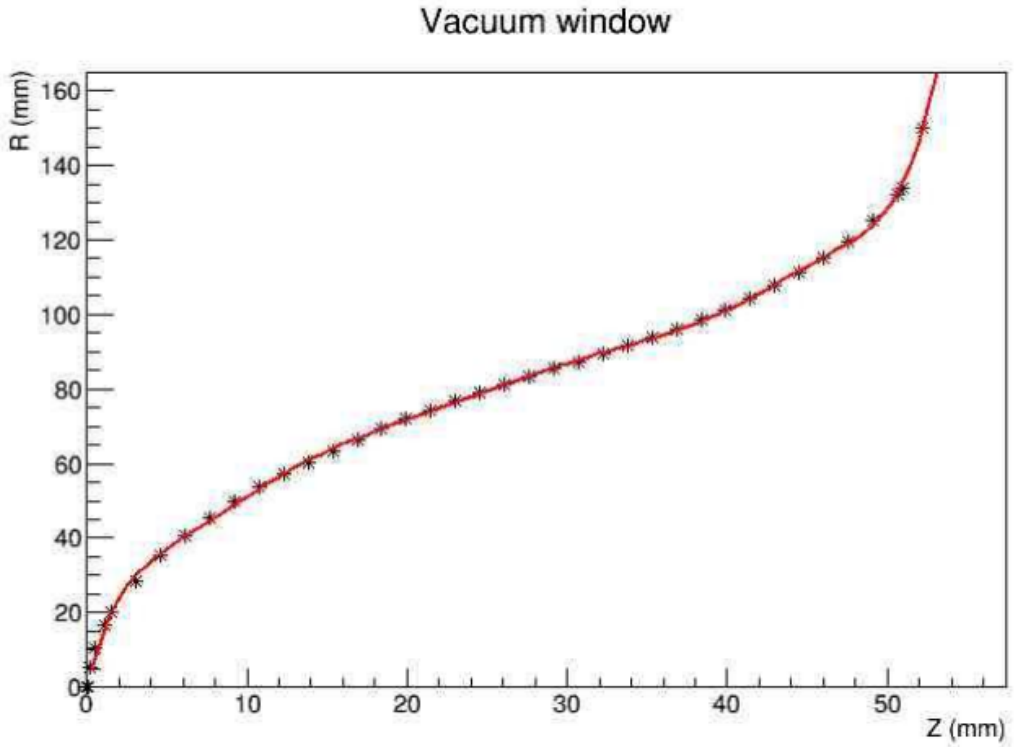
Selection overview

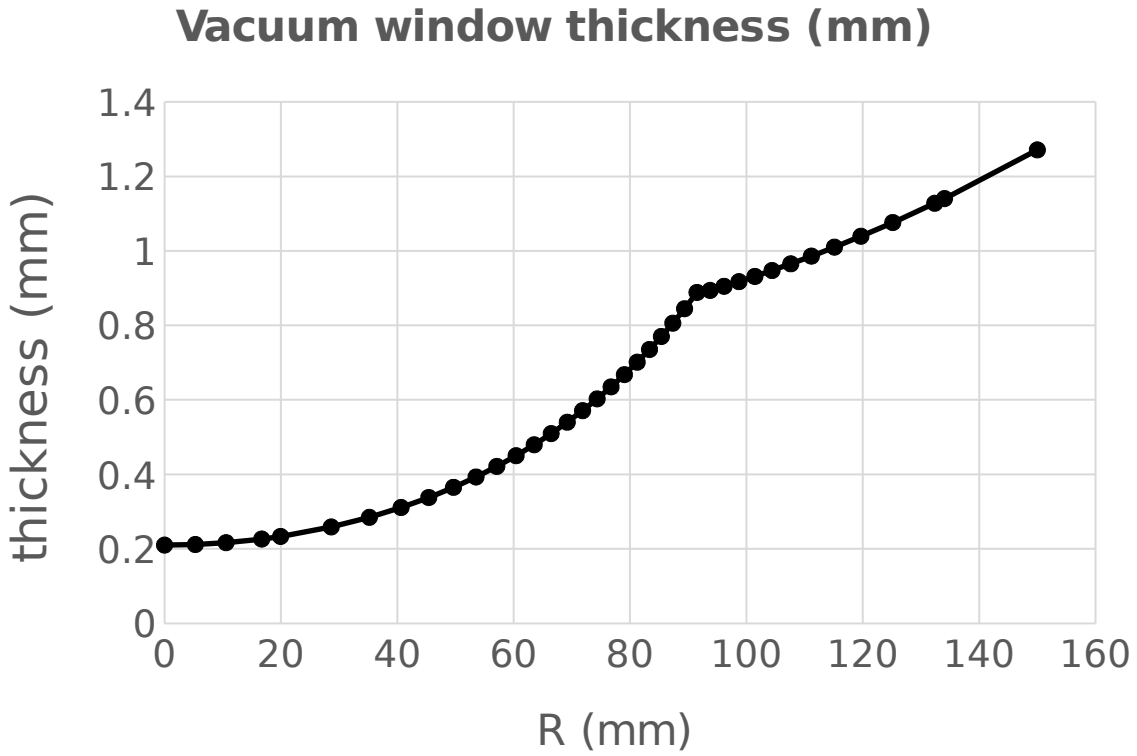
US track present	TOF		TOF Fiducial	Diffuser
1 US track 1 or no DS tracks	**Momentum (MeV/c)**	**TOF (ns)**	At DS-tracker: R < 140mm With 0.01mrad scattering	At diffuser: R < 90mm
	170	28.750->28.950		
	200	2.8082->28.282		
	240	27.398->27.598		

-50ns

+50ns

Vacuum & Absorber Al. windows



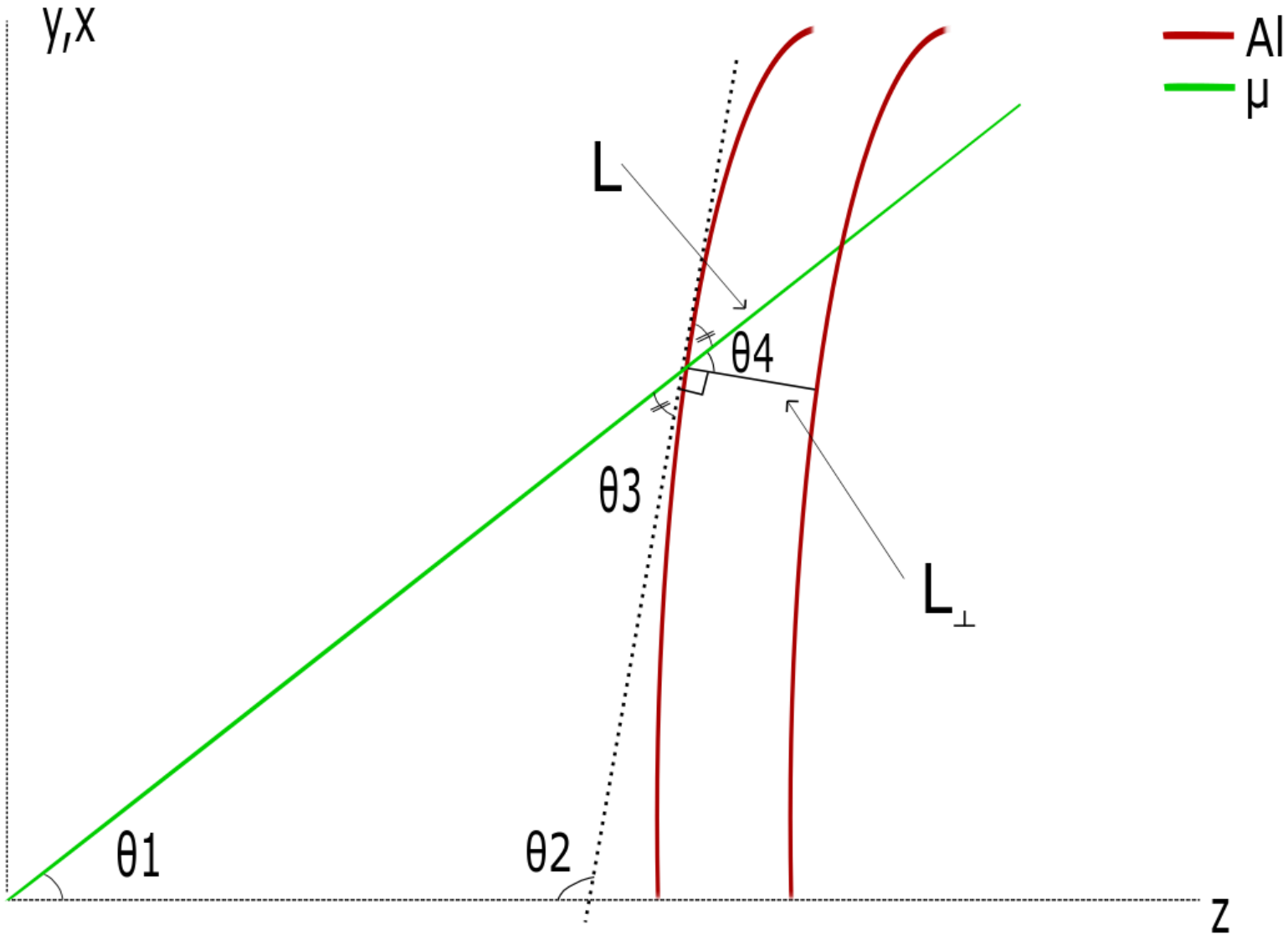


* Points: Geometry
* Red line: Pol. fit

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

[1] [R.Connors et. al. 2014 LBNL "The Thickness Measurement of MICE Absorber Aluminum Window at LBNL, Report 1"]

Aluminium traversed



Θ1=dx/dz, dy/dz

Θ2=π-(R2-R1)/(z2-z1)

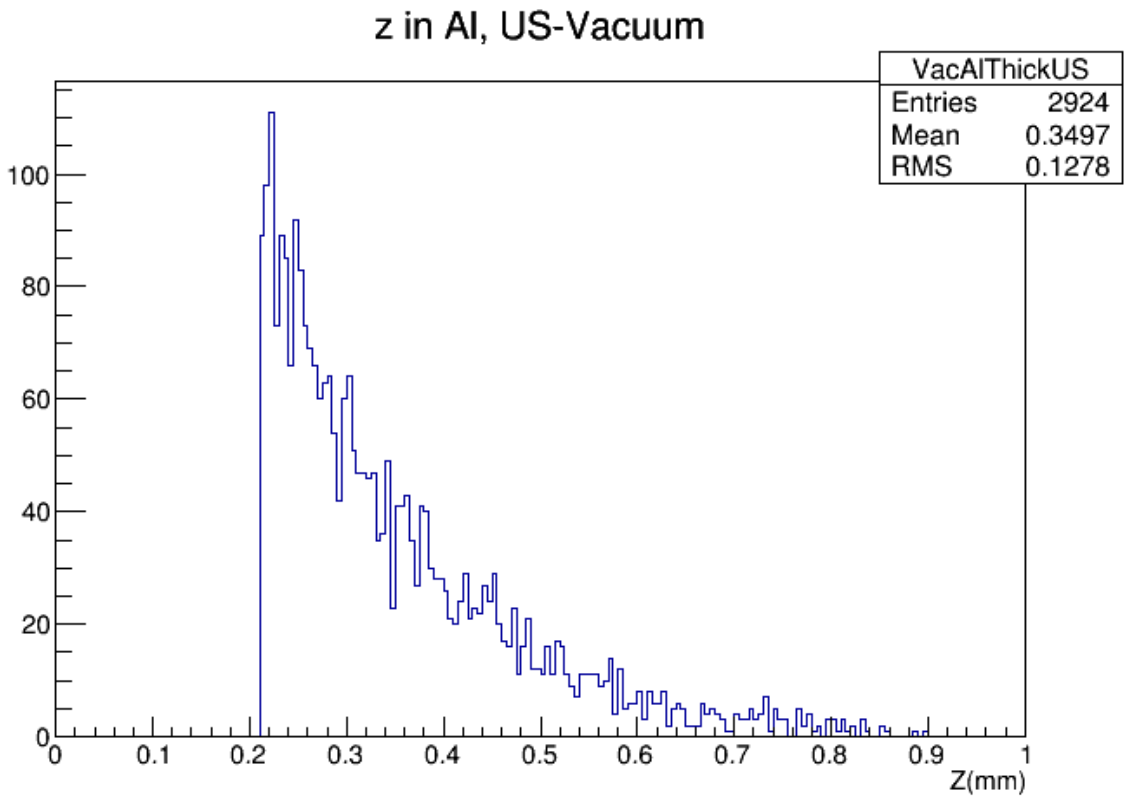
Θ3=π-(θ1+θ2)

Θ4=π/2 – θ3

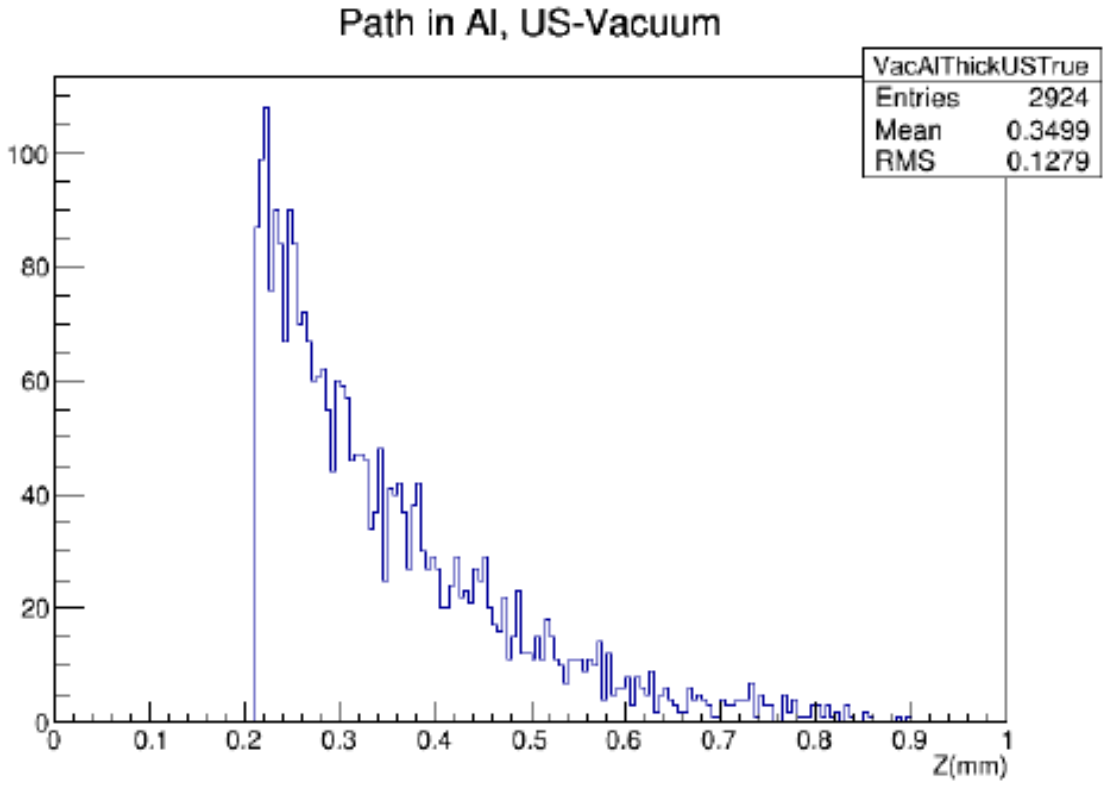
$$L = \frac{L\sqrt{2}}{\cos(\theta 4)}$$

Al. Thickness

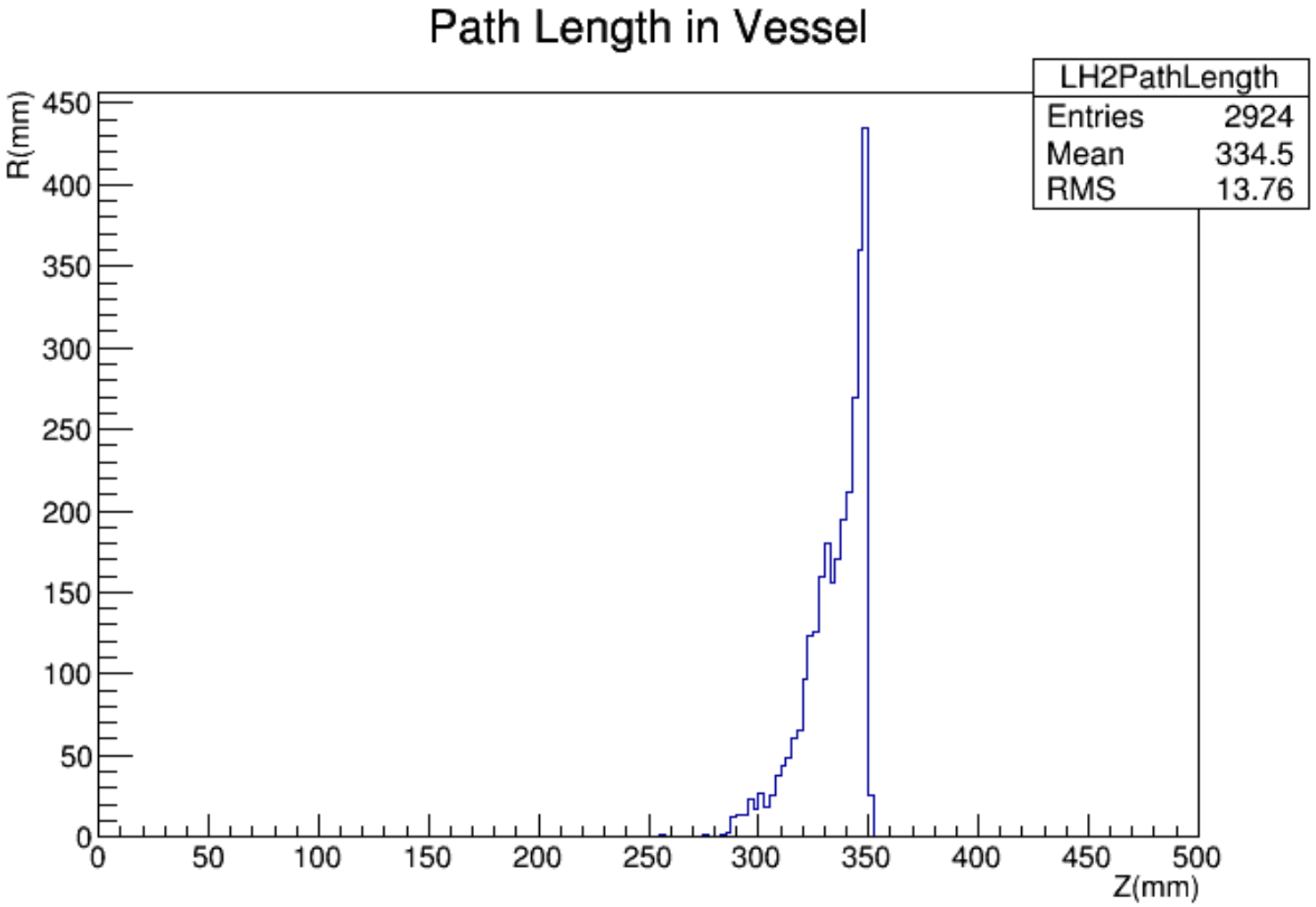
Without correction



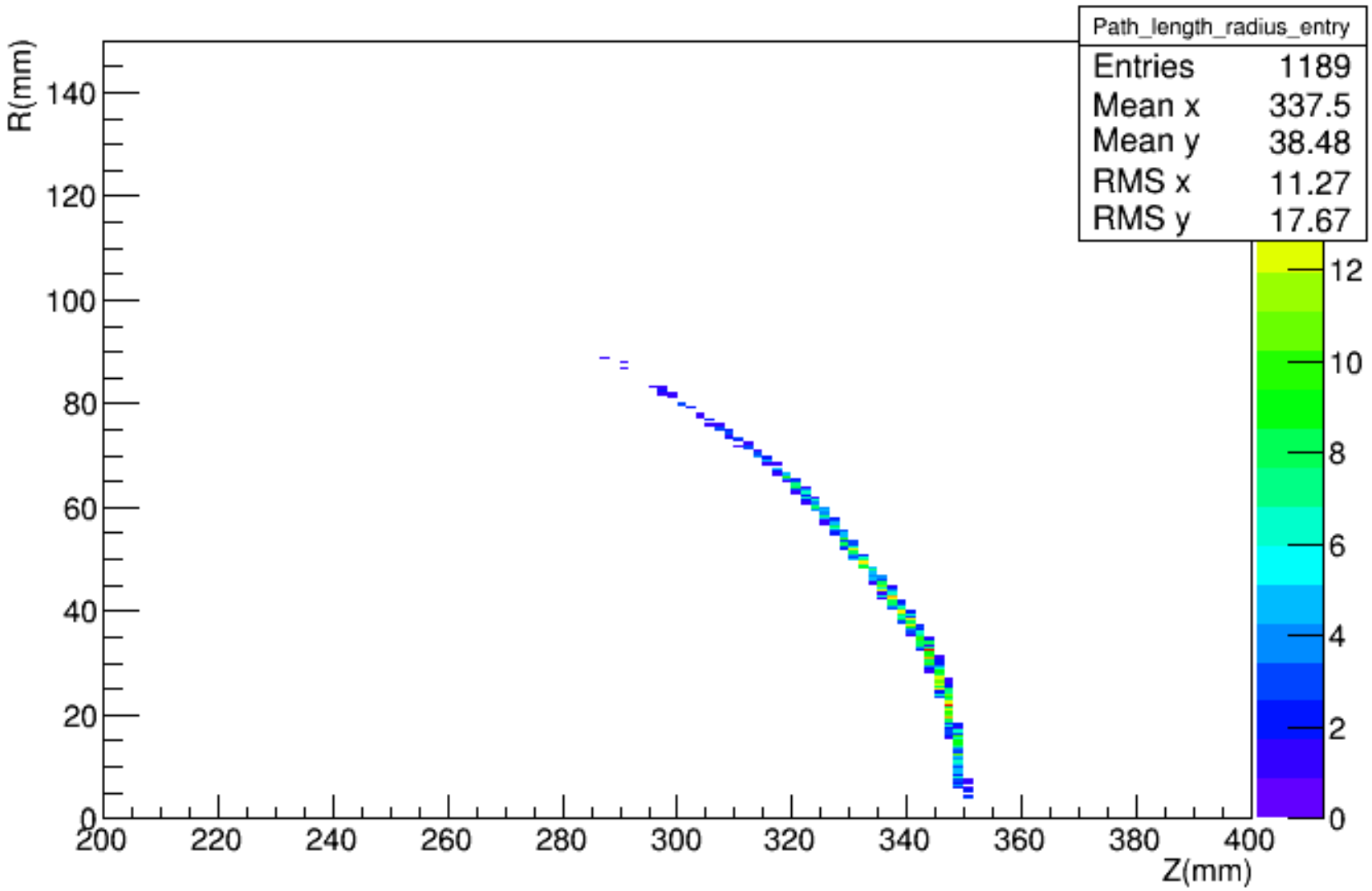
With correction



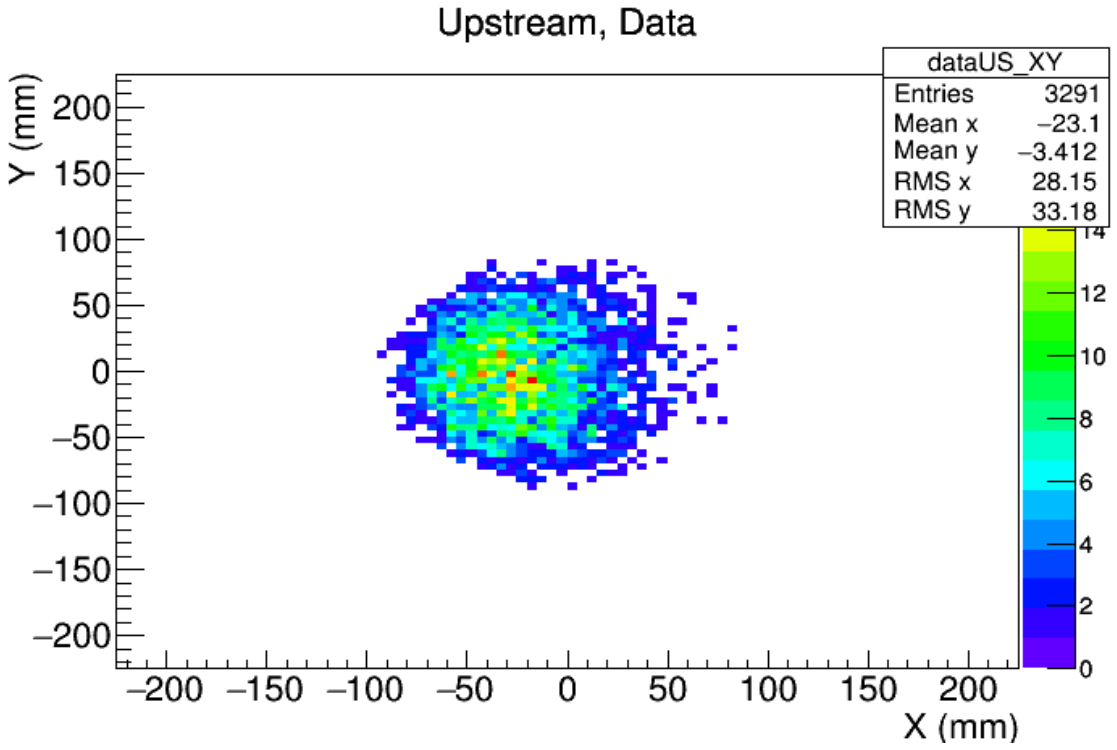
LH2 Path length

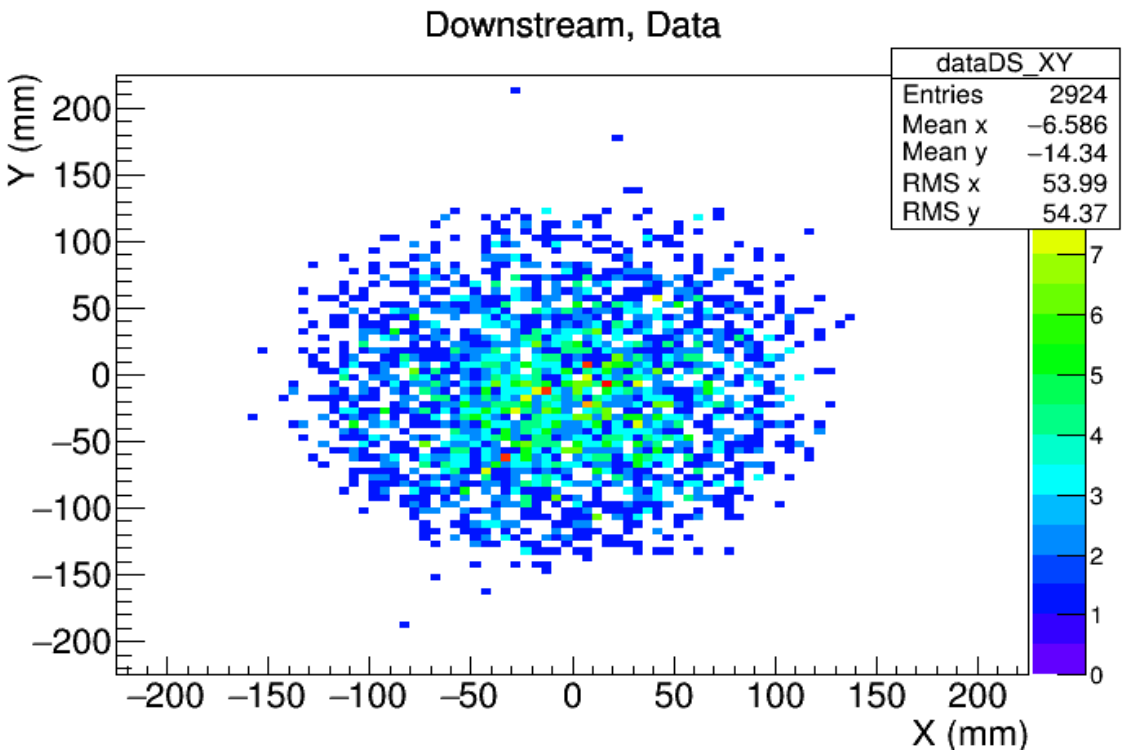


R/ Path Length



US & DS Profile





Future work for vessel

- Finalise aluminium budget calculation
- Investigate LH2 path length
- Plan for error calculation
- Fix L_R/L normalisation