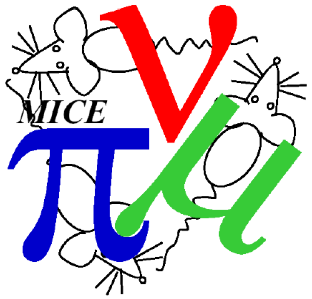
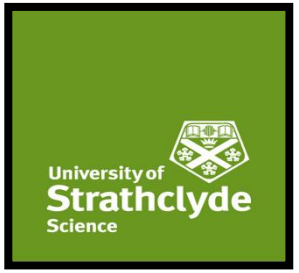


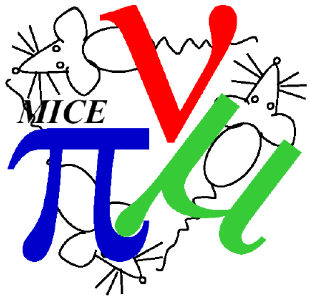


Field On Scattering

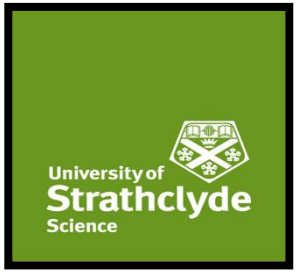
Alan Young

Department of Physics,
University of Strathclyde

26th March 2021



Update on field on analysis



From Last CM there were two main areas of concern regarding the data:

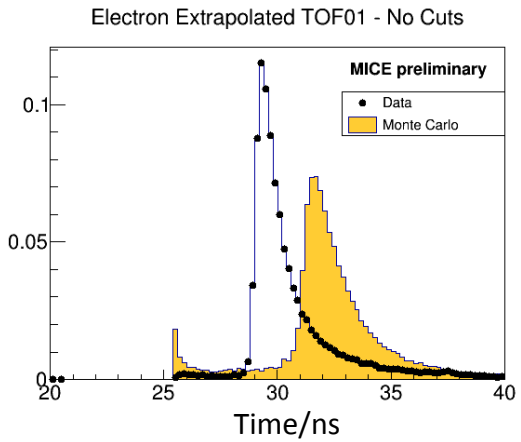
1. Lack of data after all cuts applied, particularly for the empty channel
2. Disagreement between Data and Monte Carlo particularly with:
    1. Difference in extrapolated TOF01 time for all particle species
    2. Pion momentum reconstructed from Monte Carlo is lower than that measured in data, even though there is good agreement for electrons and muons.

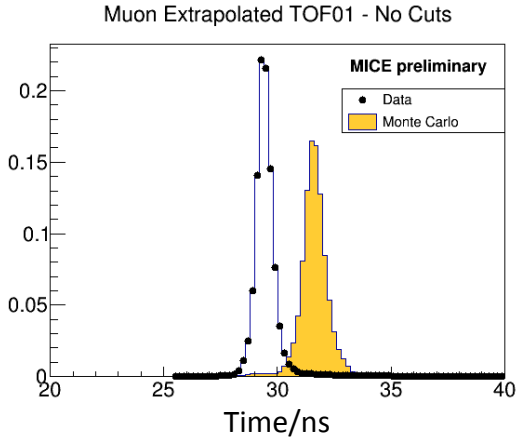
Comparison of Fiducial cut with tracks in DST
Empty 170MeV/c

	No Other Cuts		All Cuts	
Before fiducial cut correction				
Presented at CM57	**Track in DST**	**No Track in DST**	**Track in DST**	**No Track in DST**
Pass Fiducial Cut	23216	5543	3031	262
Fail Fiducial Cut	9251	32939	1454	4924
With fiducial cut correction				
Fiducial 5 Station	**Track in DST**	**No Track in DST**	**Track in DST**	**No Track in DST**
Pass Fiducial Cut	24213	6703	7805	731
Fail Fiducial Cut	8254	31779	2990	9108

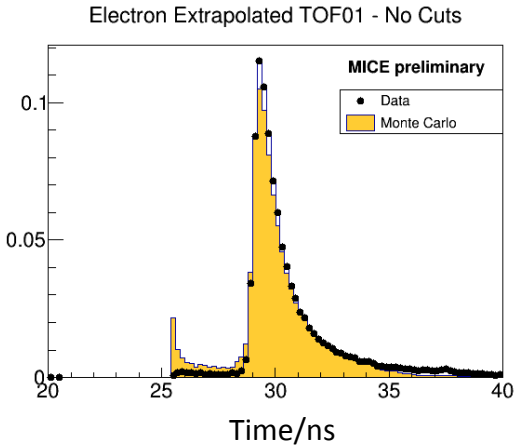
Investigation of extrapolated TOF01 at 170MeV/c for LiH dataset

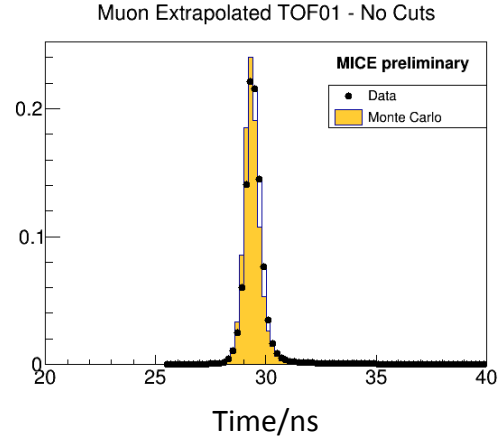
Using Globals





Globals Disabled



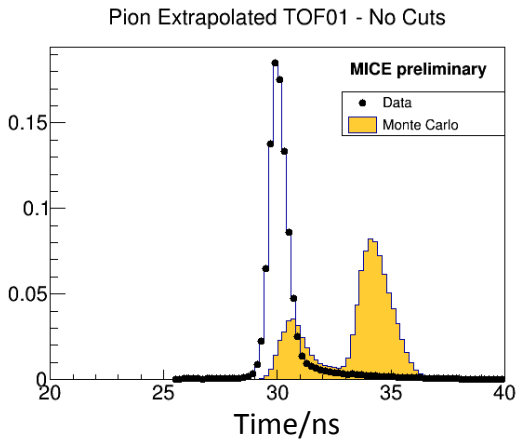


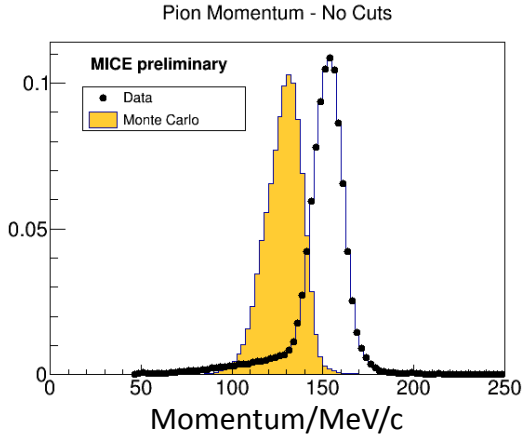
Change: Stopped using globals branch and taking information directly from detector branches.

Comparing histograms now have far better agreement between Data and Monte Carlo for Electrons and Muons for extrapolated TOF01.

Investigation of extrapolated TOF01

Using Globals





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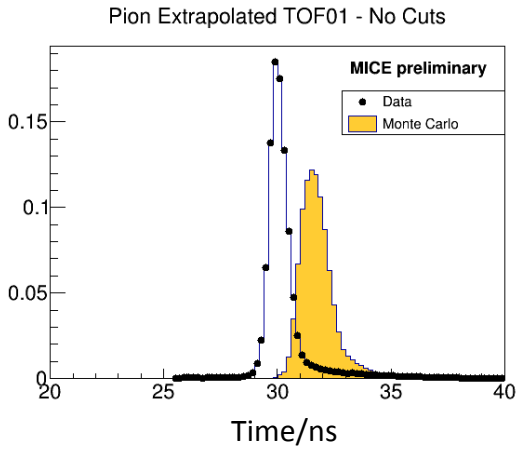
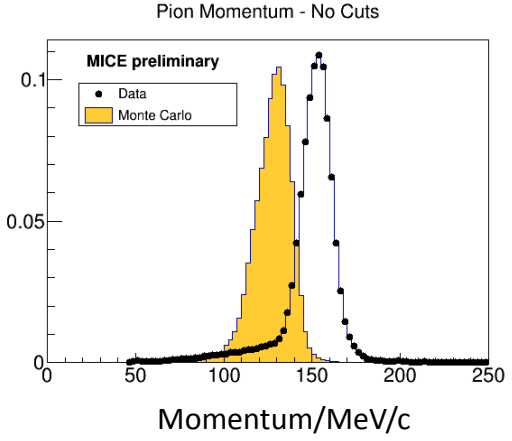
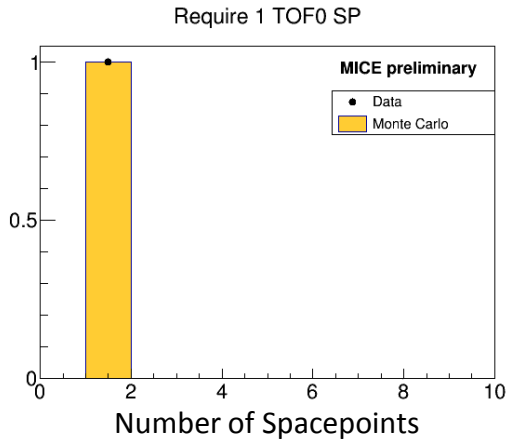
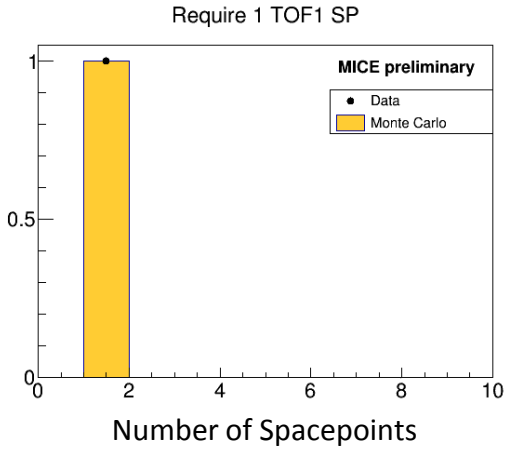


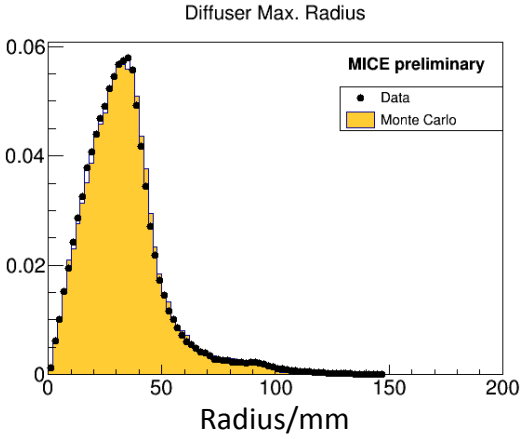


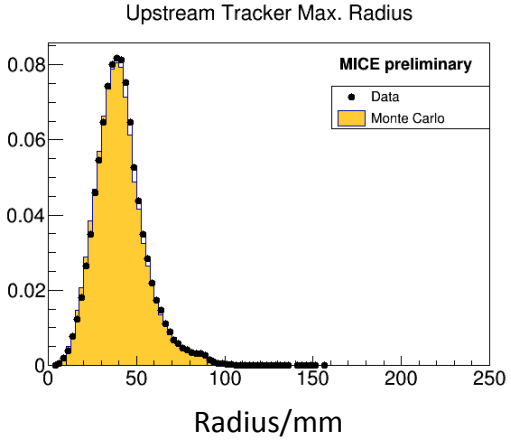
For Pions still see Monte Carlo with lower momentum than Data. However extrapolated TOF01 is now consistent with momentum discrepancy.

Other cuts with globals disabled

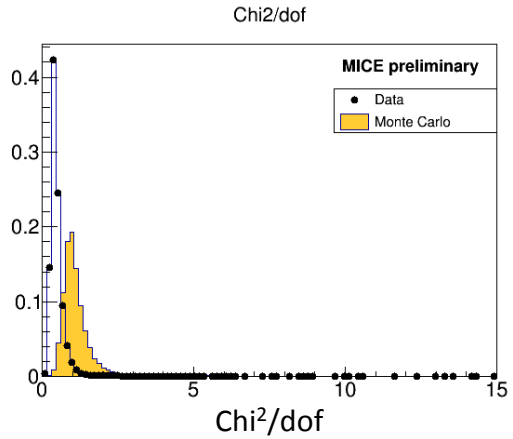


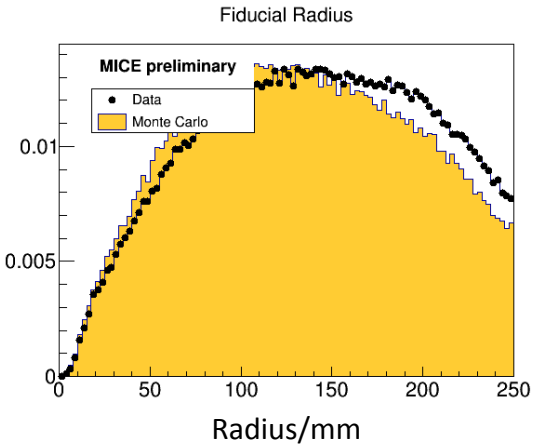


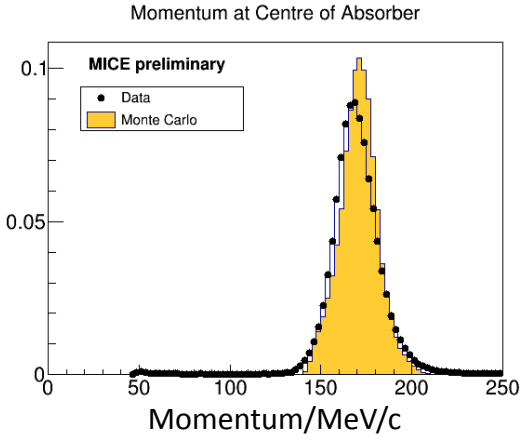


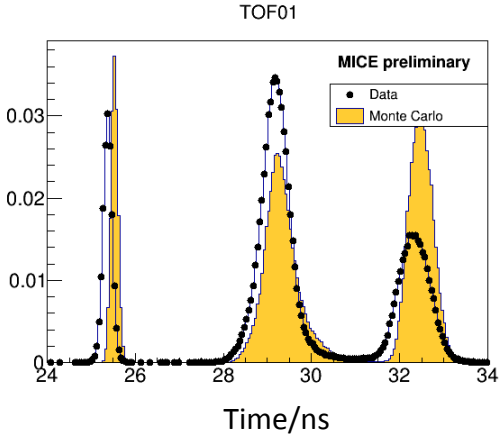


Other cuts with globals disabled









Future Work

- Correction to fiducial code has resulted in more than double the number of events available for analysis in the empty channel
- Removal of globals code has resulted in significant improvement in agreement of extrapolated TOF01 between data and Monte Carlo
- Looking at Monte Carlo truth as part of investigating difference in Pion momentum
- Need to understand why change in code has led to better agreement for electrons and muons with extrapolated TOF01