Progress Update

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N-dimensional Gridsearch

Sample	cut	numu/numub CC	intrinsic nue/nueb CC	osc nue/nueb CC	numu/numub NC	intrinsic nue/nueb NC	Signal	Bkgd	Purity	FOM
2Repi	baseline	1.48	2.00	1.76	3.17	0.21	1.76	6.87	0.20	0.601
	Erec < 1.5 GeV	0.28	0.82	1.57	2.45	0.16	1.57	3.72	0.30	0.683

Sample	cut	numu/numub CC	intrinsic nue/nueb CC	osc nue/nueb CC	numu/numub NC	intrinsic nue/nueb NC	Signal	Bkgd	Purity	FOM
2Repi1de	baseline	3.35	2.28	2.85	1.63	0.13	2.85	7.38	0.28	0.892
	Erec < 1.5 GeV	0.71	0.85	2.58	1.04	0.09	2.58	2.70	0.49	1.124

- Got it working by converting to a single 1D CC and a single 1D NC histogram for each selection, which each bin representing a different point in the grid
- 11 grid points per cut
- 1.5 GeV cut included in baseline

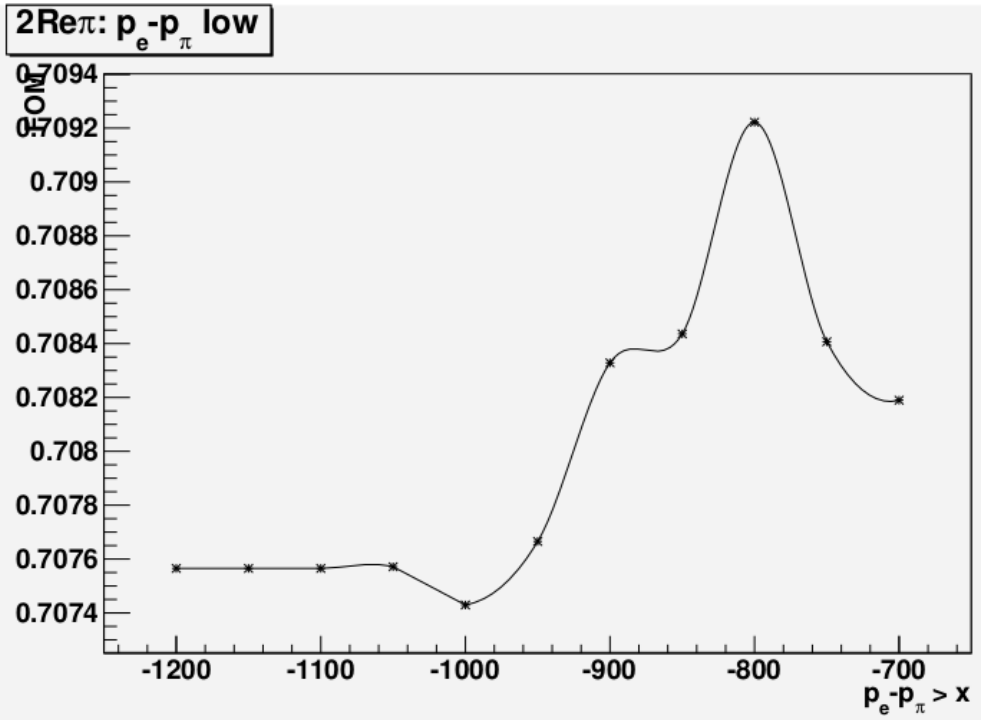
- 2Repi (7 variables):
  - p_e-p_π low
  - p_e-p_π high
  - p_{low}
  - $m_{e\pi}$ vs $nll_{2Re\pi}$-nll_{2Ree}
- 2Reπ1de (3 variables):
  - p_e-p_π low
  - p_e-p_π high
  - d2se

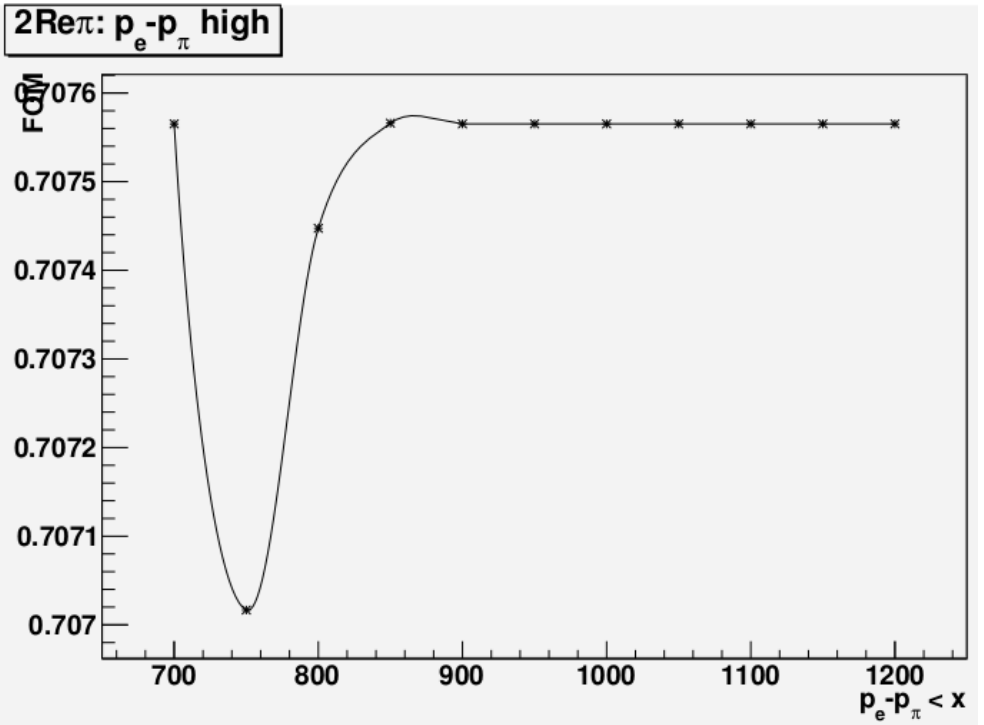
Gridsearch Summary

2Reπ
Max: (11,3,2,7,6,9,1)
Max FOM = 0.738
p_e-p_π low = -700
p_e-p_π high = 800
p_{low} = 44
$m_{e\pi}$ low = 260
$m_{e\pi}$ high = 360
$nll_{2Re\pi}$-nll_{2Ree} low = -70
$nll_{2Re\pi}$-nll_{2Ree} high = -50

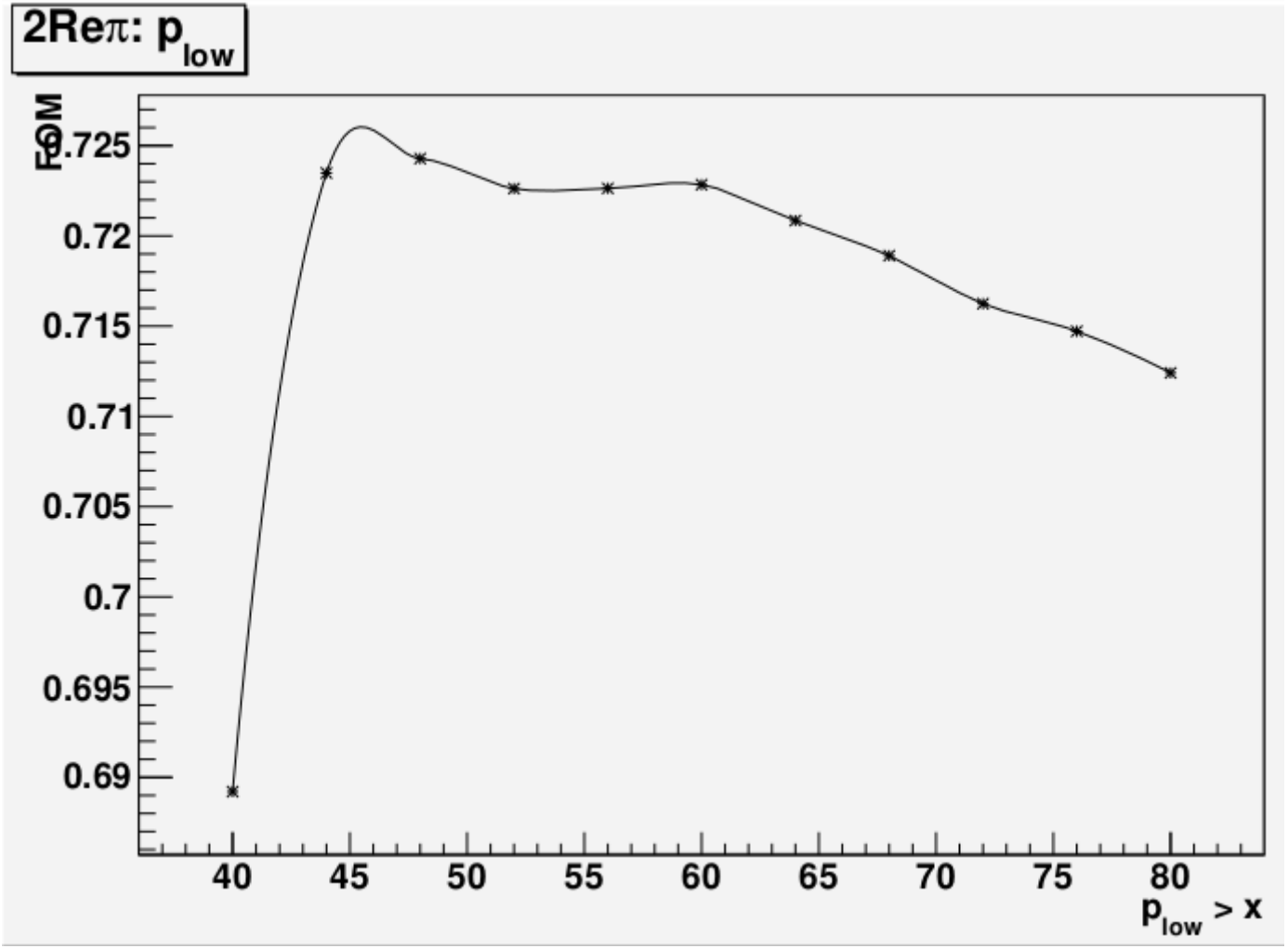
2Reπ1de
Max: (10,1,5)
Max FOM = 1.130
p_e-p_π low = -550
p_e-p_π high = 500
d2se = 190

1D plots: 2Reπ

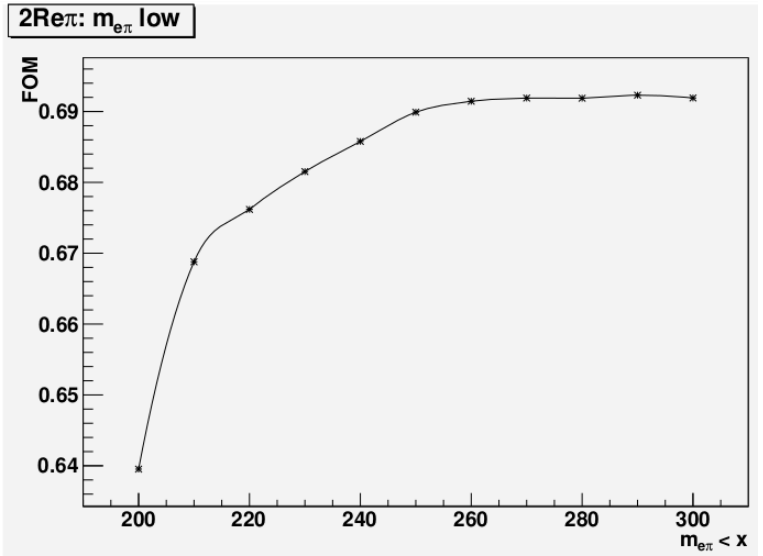


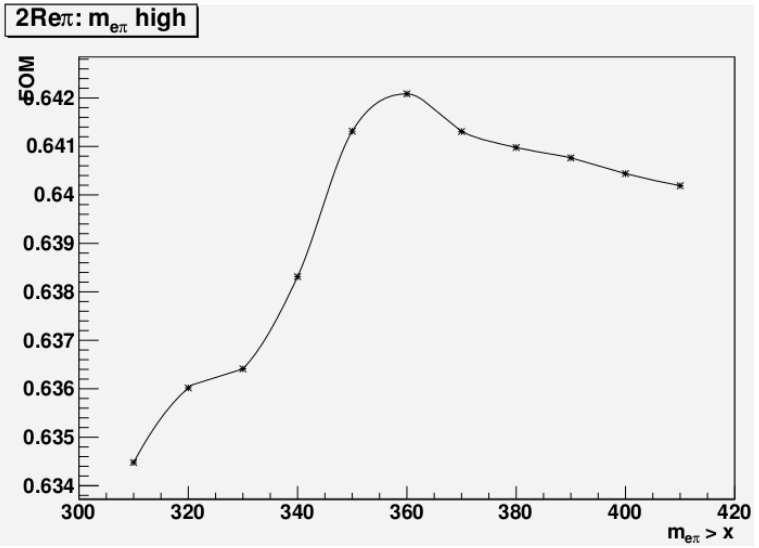


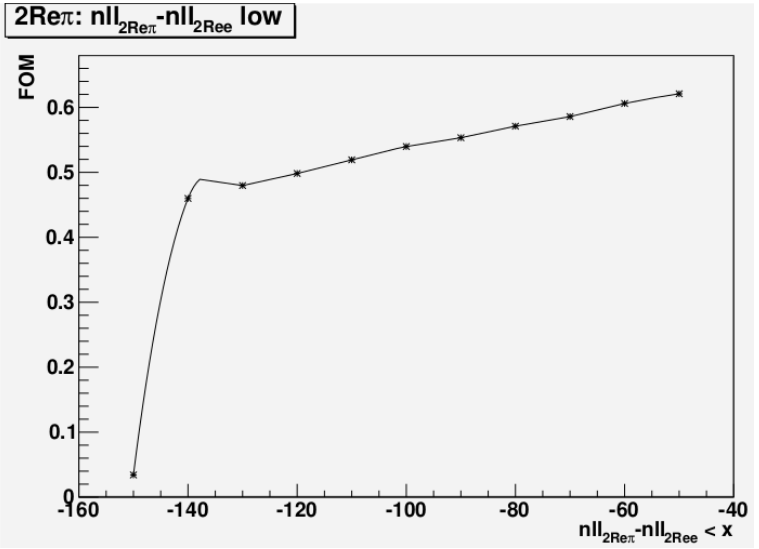
1D plots: 2Reπ

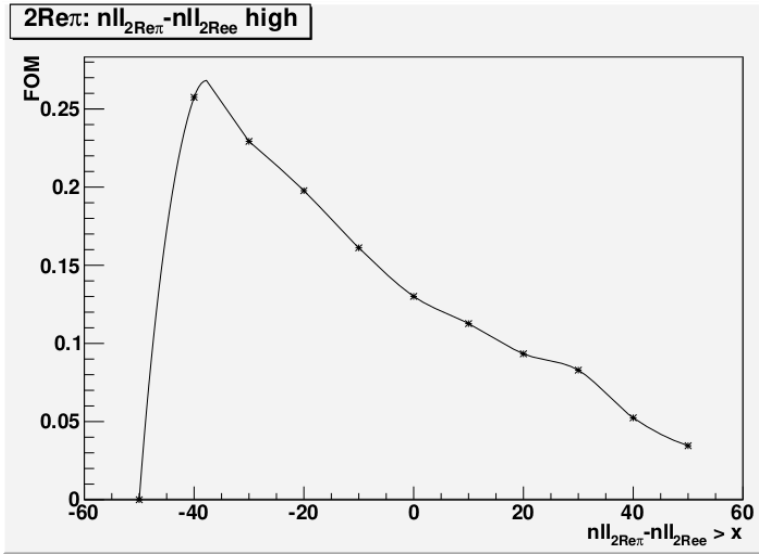


1D plots: 2Reπ

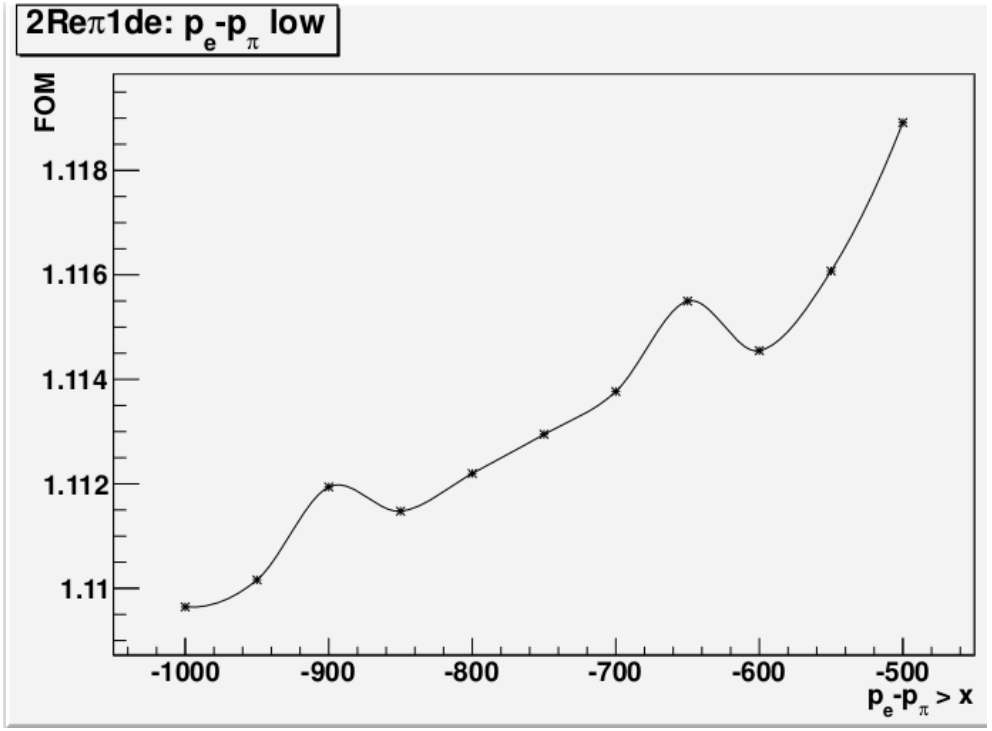


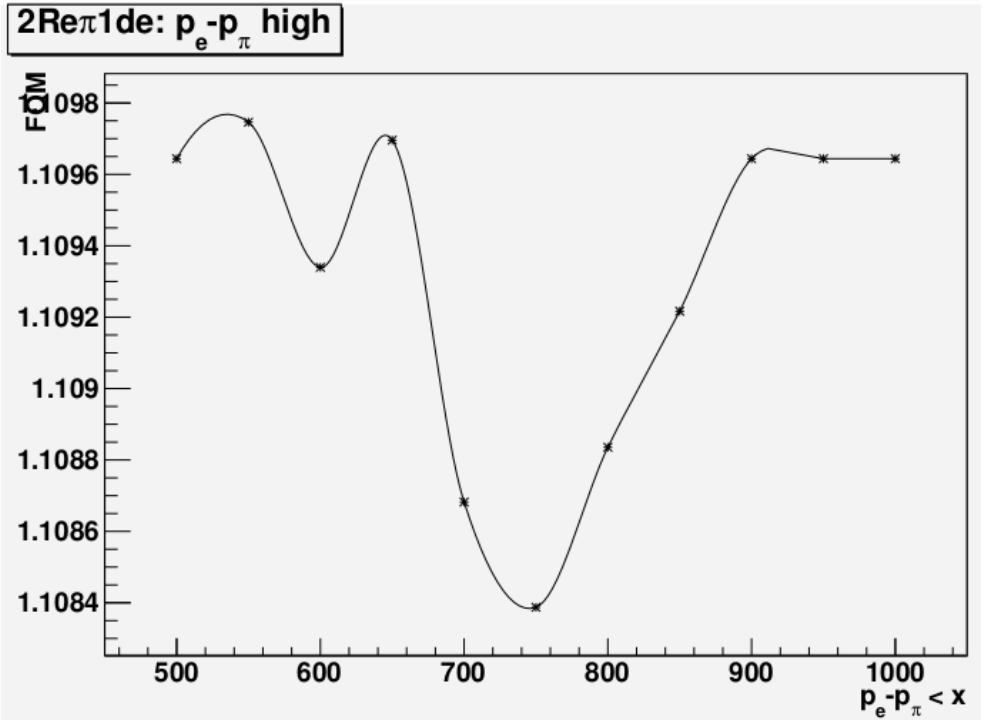




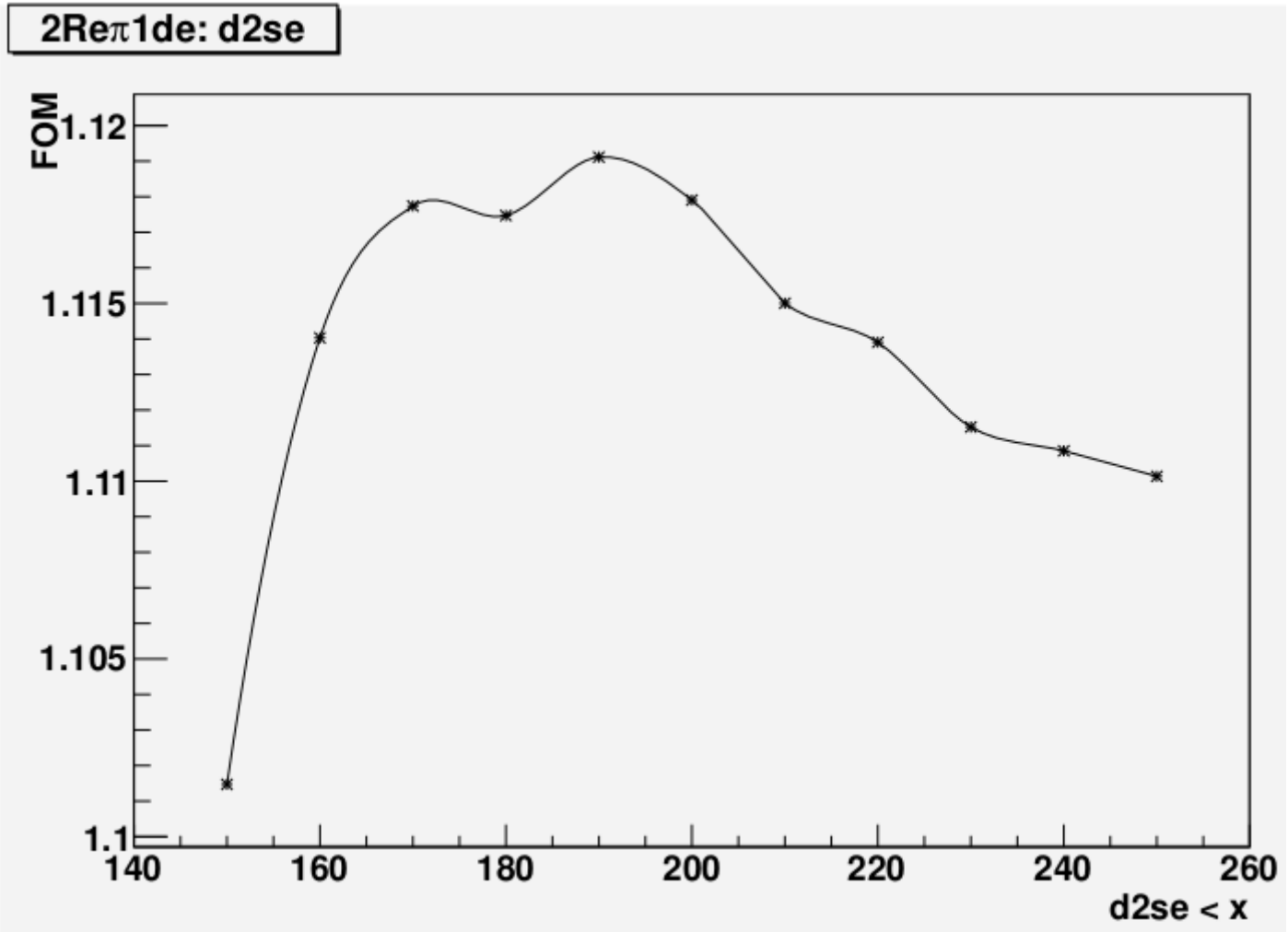


1D plots: 2Reπ1de





1D plots: 2Reπ1de



Machine Learning

- Want to look at performance of cuts using TMVA package in ROOT
- First, see how rectangular cuts compare, then look toward other types of cuts
  - possible to move entire grid search to TMVA?