

Muon quality cut studies

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Methods

Jpsi mass window (2.6, 3.5) GeV

3 rapidity bins – (0, 1.2), (1.2,1.6) , (1.6, 2.4)

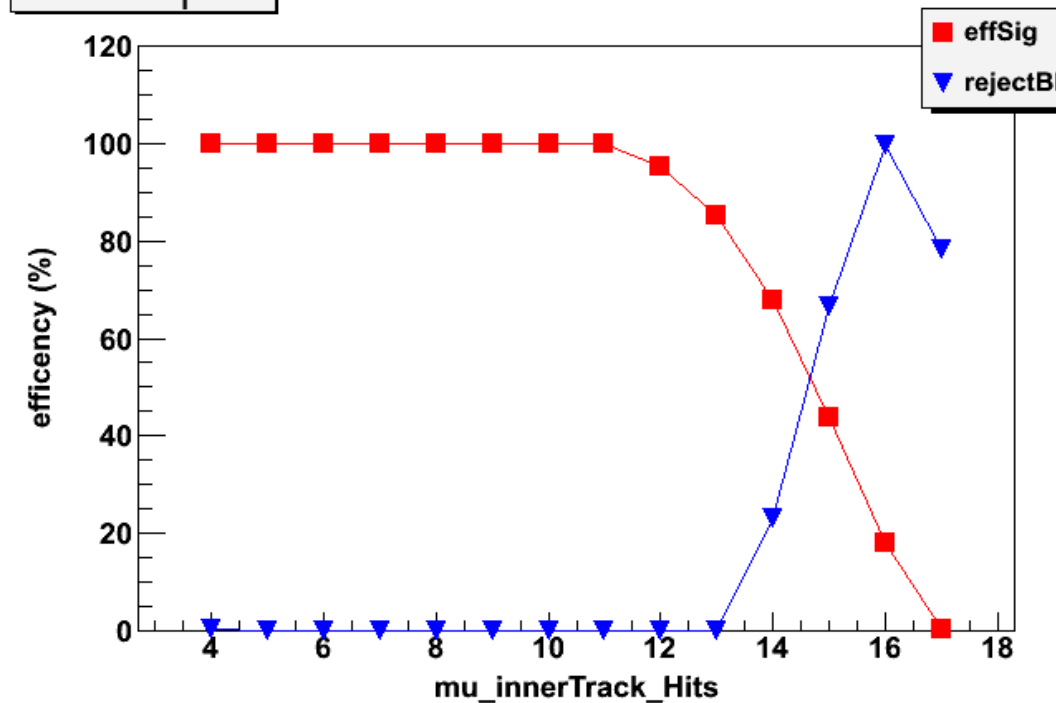
$\text{EffSig} = \text{nSig_cut} / \text{nSig_nocut}$

$\text{RejBkg} = 1 - \text{nBG_cut} / \text{nBG_nocut}$

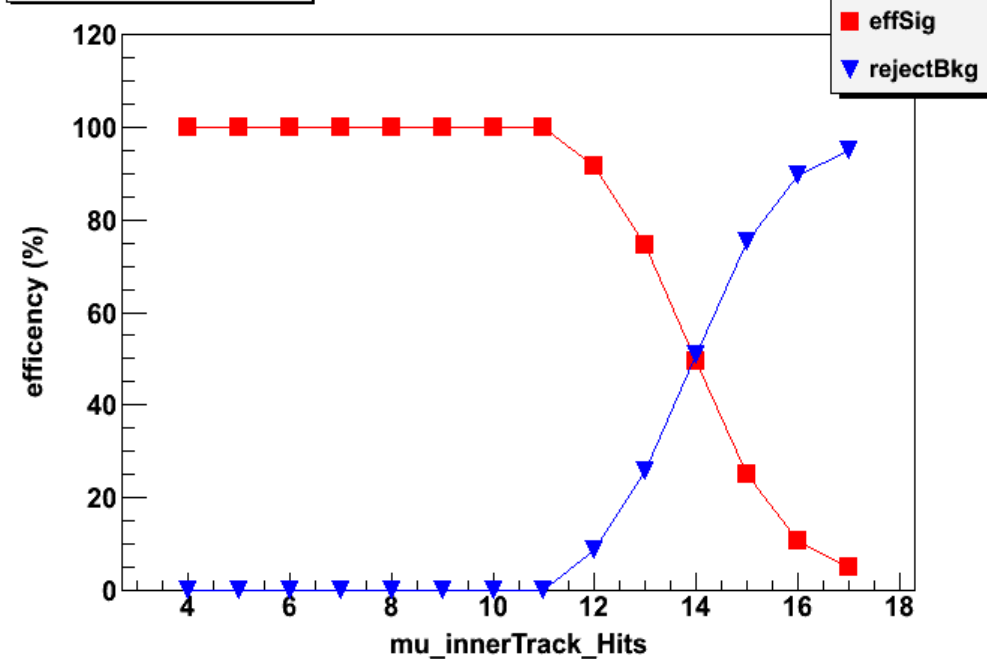
OniaToMuMuSkim data for J/Psi sample
</castor/cern.ch/user/p/pshukla/cms394/MC/DMJPsiOniaSkim>

mu_innerTrack_Hits

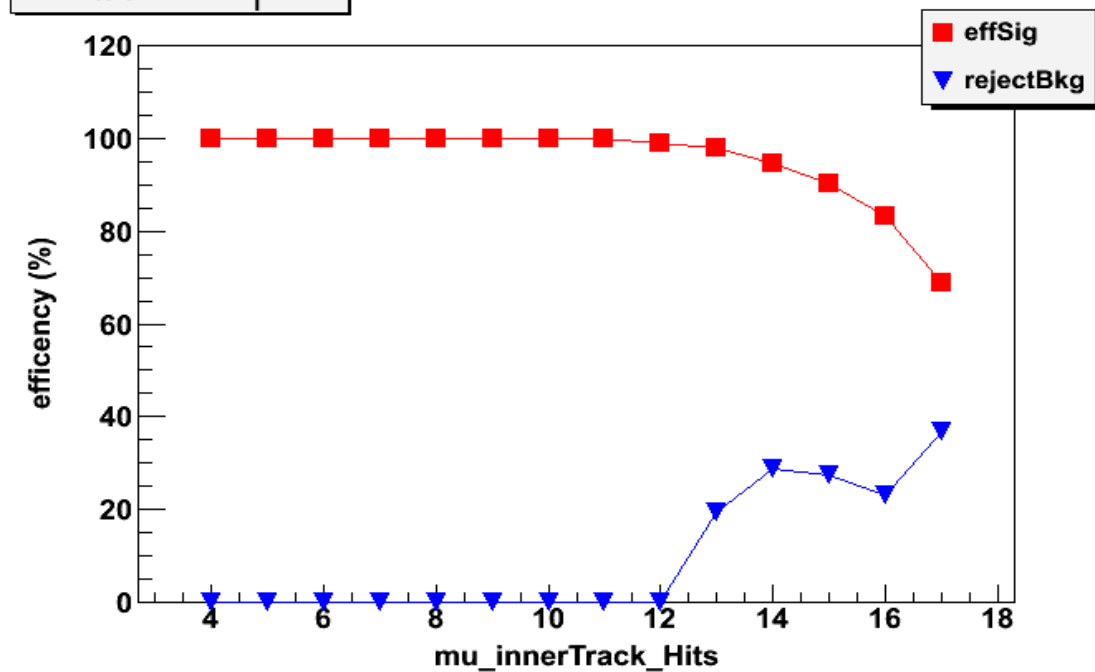
$|y| < 1.2, P_T > 0.0$



$1.2 < |y| < 1.6, P_T > 0.0$



$1.6 < |y| < 2.4, P_T > 0.0$



mu_innerTrack_Hits

$|y| < 1.2$

Cut value	4	5	6	7	8	9	10
Effi sig%	100	100	100	100	100	100	100
RejBkg%	0.21	0	0	0	0	0	0
Cut value	11	12	13	14	15	16	17
Effi sig%	100	95.3	85.2	67.8	43.8	18.0	0.15
RejBkg%	0	0	0	23.03	66.5	99.7	78.3

$1.2 < |y| < 1.6$

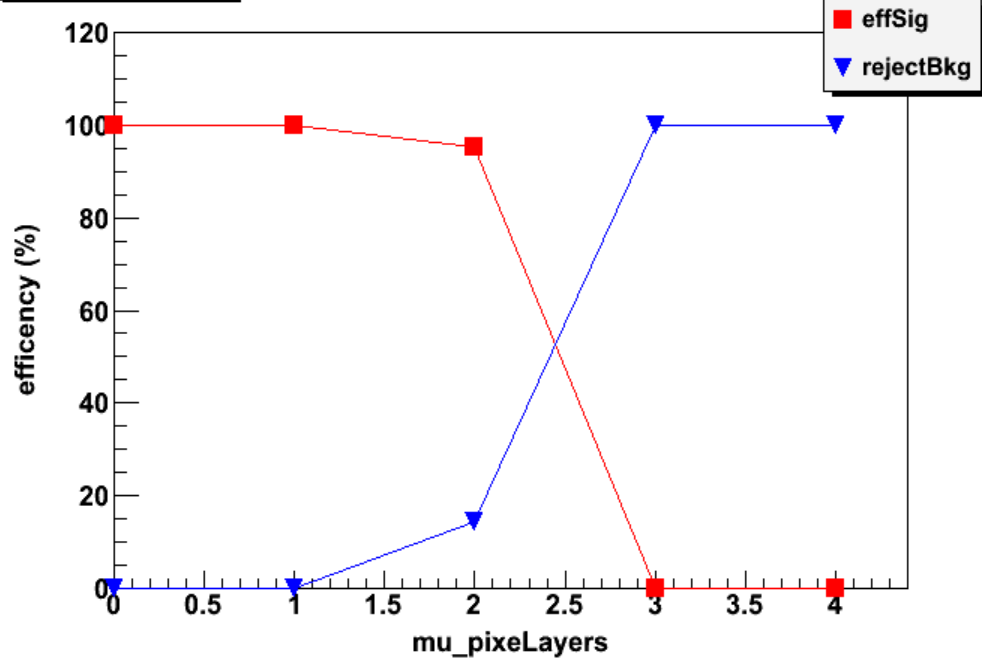
Cut value	4	5	6	7	8	9	1.2 < y < 1.6
Effi sig%	100	100	100	100	100	100	100
RejBkg%	0	0	0	0	0	0	0
Cut value	11	12	13	14	15	16	17
Effi sig%	100	91.4	74.4	49.3	25.1	10.5	5.08
RejBkg%	0	8.6	25.5	50.7	75.2	89.7	95.04

$1.6 < |y| < 2.4$

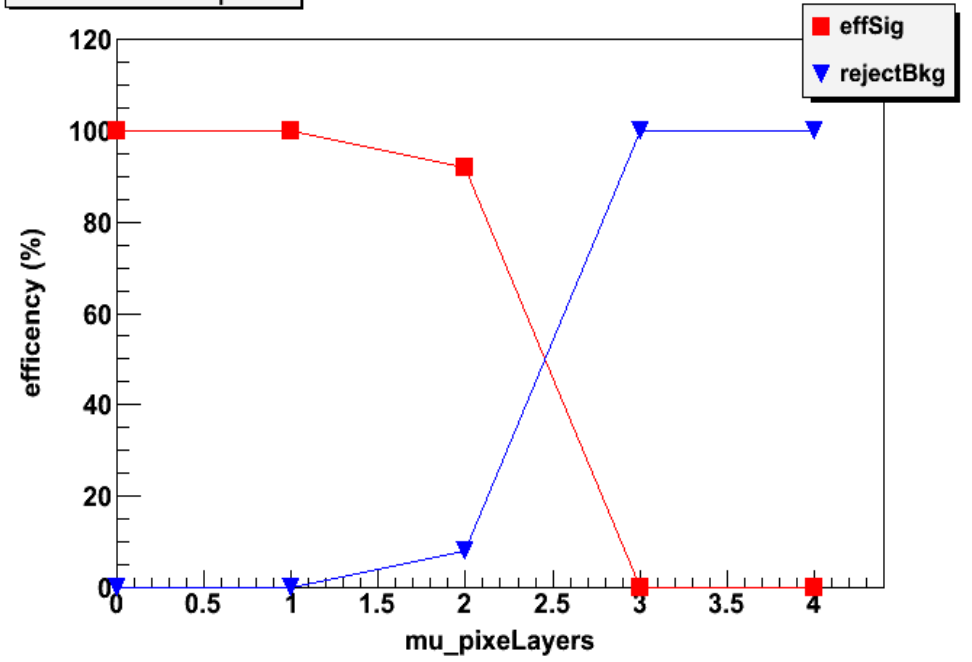
Cut value	4	5	6	7	8	9	1.6 < y < 2.4
Effi sig%	100	100	100	100	100	100	100
RejBkg%	0	0	0	0	0	0	0
Cut value	11	12	13	14	15	16	17
Effi sig%	100	99.1	97.9	94.7	90.1	83.2	68.8
RejBkg%	0	0	19.4	28.7	27.4	22.8	36.7

mu_pixeLayers

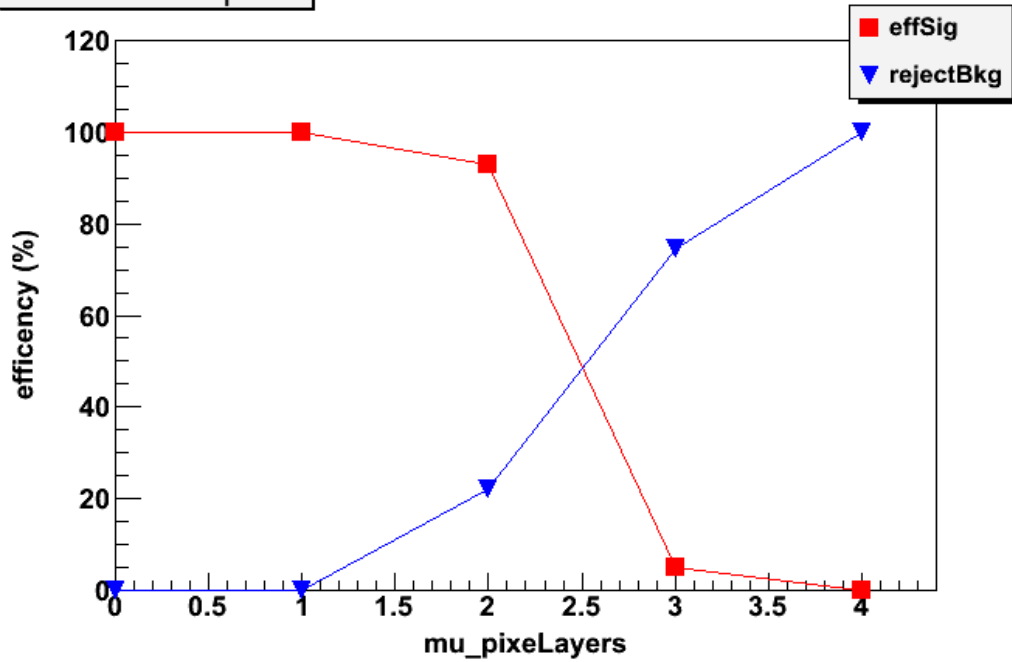
$|y| < 1.2, P_T > 0.0$



$1.2 < |y| < 1.6, P_T > 0.0$



$1.6 < |y| < 2.4, P_T > 0.0$



Mu_pixelLayers

$|y| < 1.2$

Cut value	0	1	2	3	4
Effi sig%	100	99.9	95.3	0	0
RejBkg	0	0	14.3	100	100

$1.2 < |y| < 1.6$

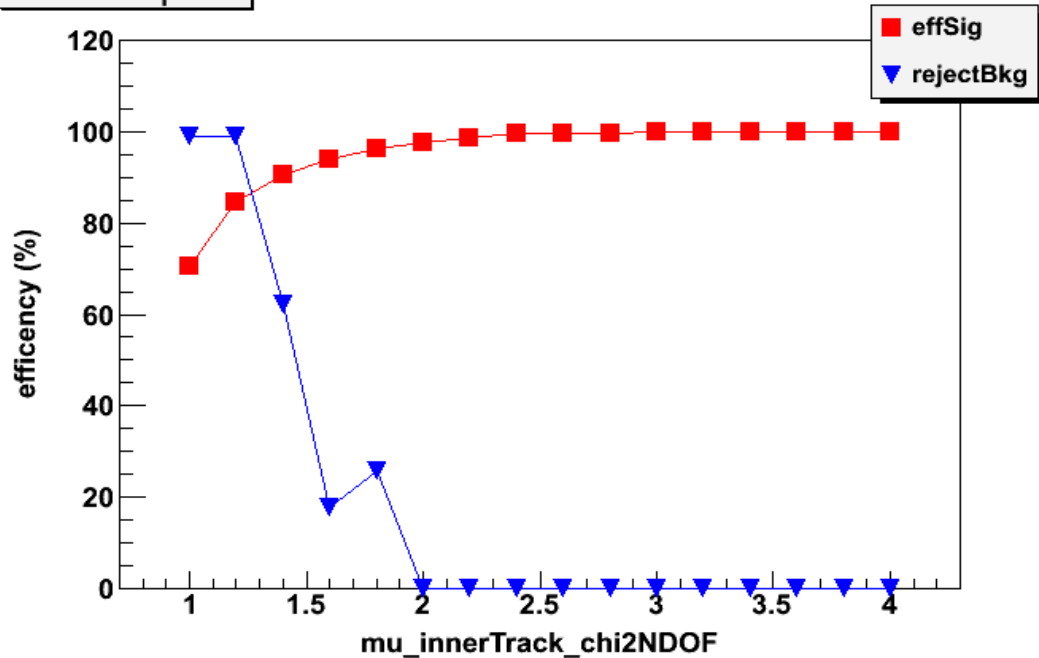
Cut value	0	1	2	3	4
Effi sig%	100	100	91.8	0	0
RejBkg	0	0	7.84	100	100

$1.6 < |y| < 2.4$

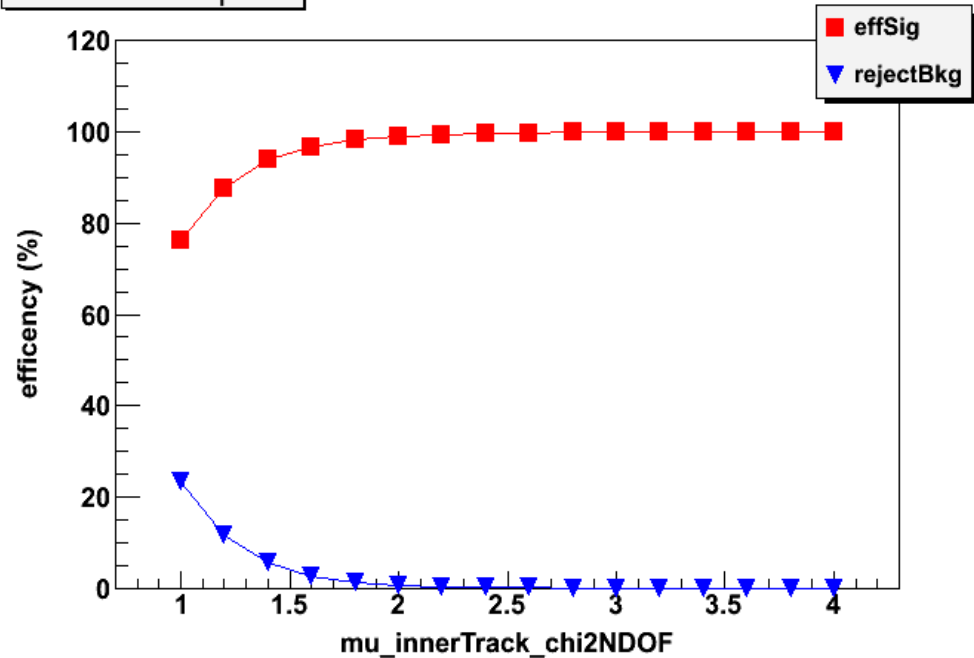
Cut value	0	1	2	3	4
Effi sig%	100	100	92.9	5.06	0
RejBkg	0	0	22.1	74.4	100

mu_innerTrack_chi2NDOF

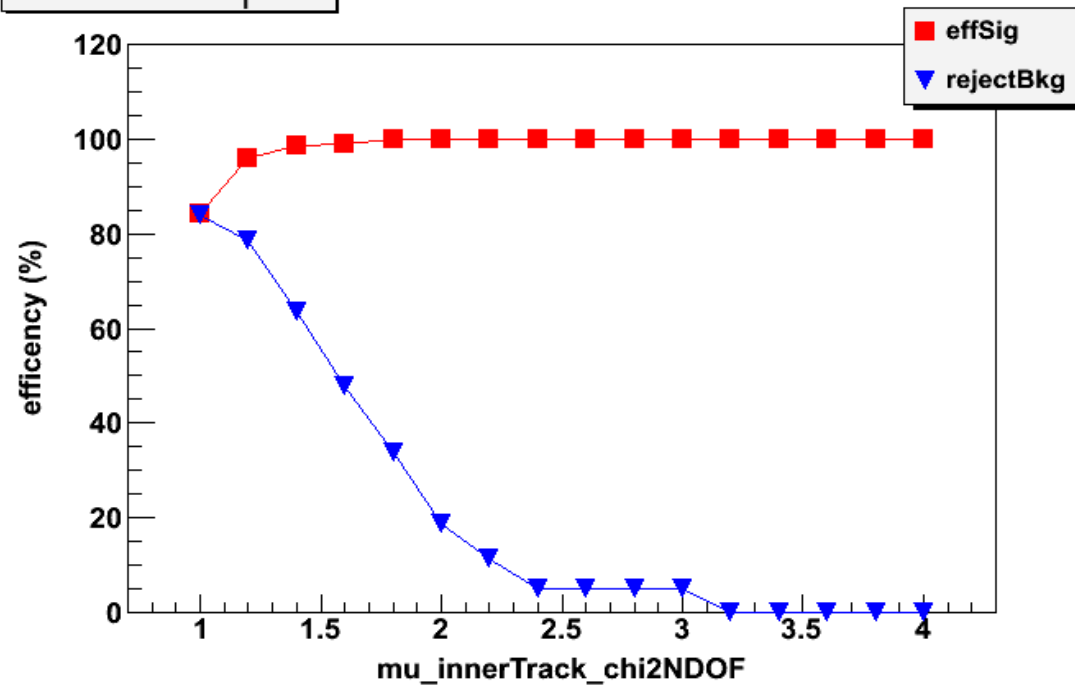
$|y| < 1.2, P_T > 0.0$



$1.2 < |y| < 1.6, P_T > 0.0$



$1.6 < |y| < 2.4, P_T > 0.0$



mu_innerTrack_chi2NDOF

$|y| < 1.2$

Cut value	1	1.2	1.4	1.6	1.8	2	2.2	2.4
Effi sig%	70.4	84.5	90.7	93.8	96.3	97.7	98.7	99.5
RejBkg	99.08	98.8	62.1	17.6	25.6	0	0	0
Cut value	2.6	2.8	3	3.2	3.4	3.6	3.8	4
Effi sig%	97.5	97.5	99.9	99.9	99.9	100	100	100
RejBkg	0	0	0	0	0	0	0	0

$1.2 < |y| < 1.6$

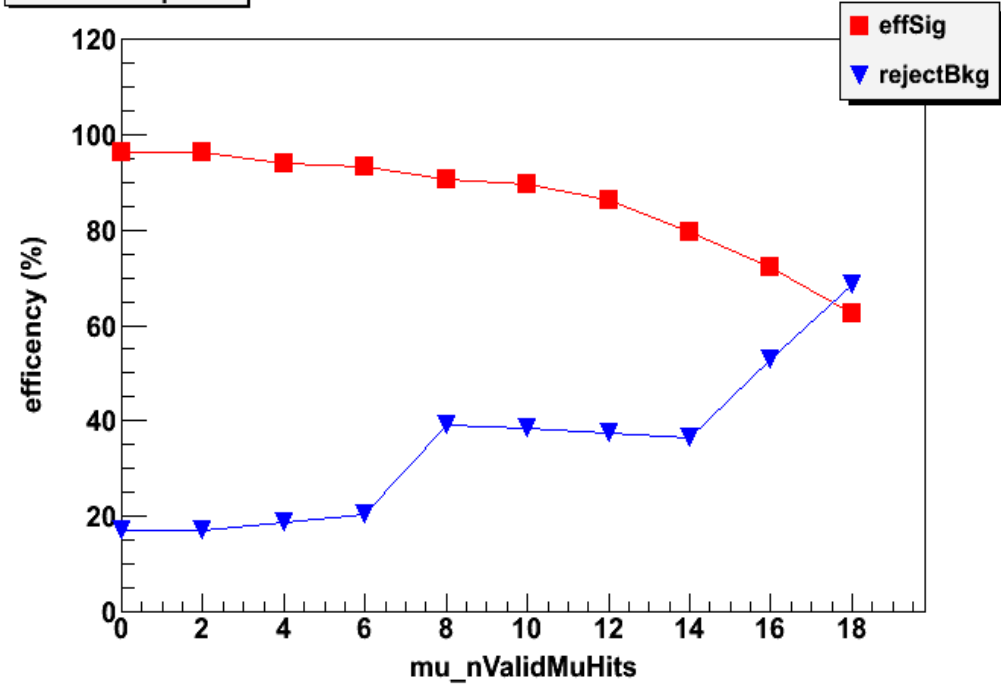
Cut value	1	1.2	1.4	1.6	1.8	2	2.2	2.4
Effi sig%	76.1	87.5	93.8	96.6	98.1	98.9	99.4	99.6
RejBkg	23.3	11.5	5.66	2.62	1.17	0.49	0.33	0.21
Cut value	2.6	2.8	3	3.2	3.4	3.6	3.8	4
Effi sig%	99.6	99.8	100	100	100	100	100	100
RejBkg	0.21	0.11	0	0	0	0	0	0

$1.6 < |y| < 2.4$

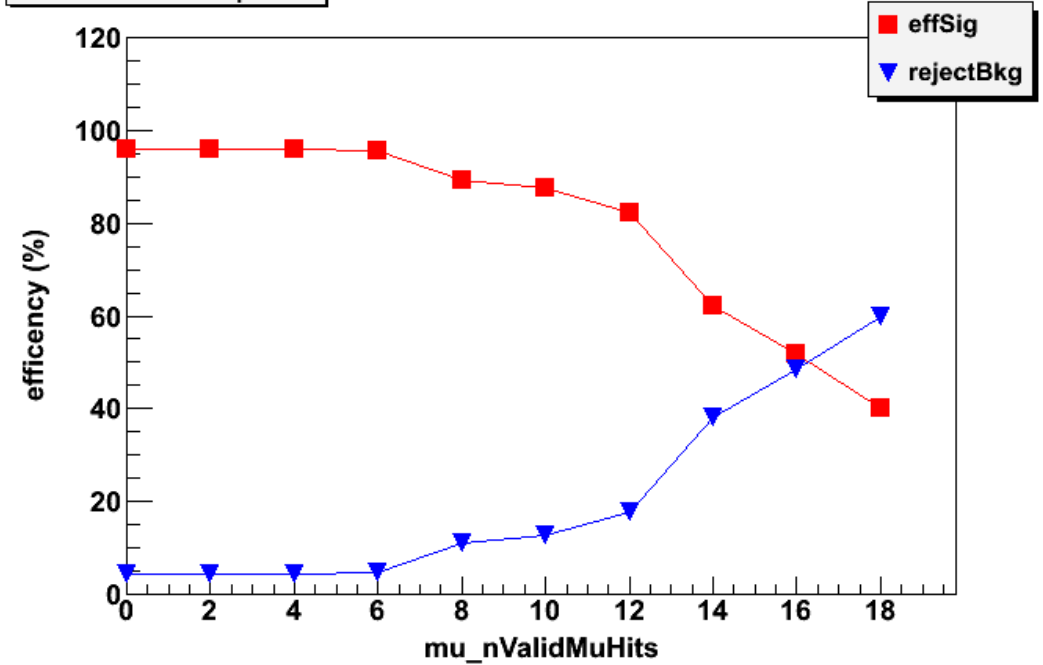
Cut value	1	1.2	1.4	1.6	1.8	2	2.2	2.4
Effi sig%	84.2	96.1	98.5	99.0	99.8	100	100	100
RejBkg	83.9	78.6	63.4	47.7	33.7	18.6	11.3	4.92
Cut value	2.6	2.8	3	3.2	3.4	3.6	3.8	4
Effi sig%	100	100	100	100	100	100	100	100
RejBkg	4.92	2.8	4.92	0	0	0	0	0

mu_validMuHits

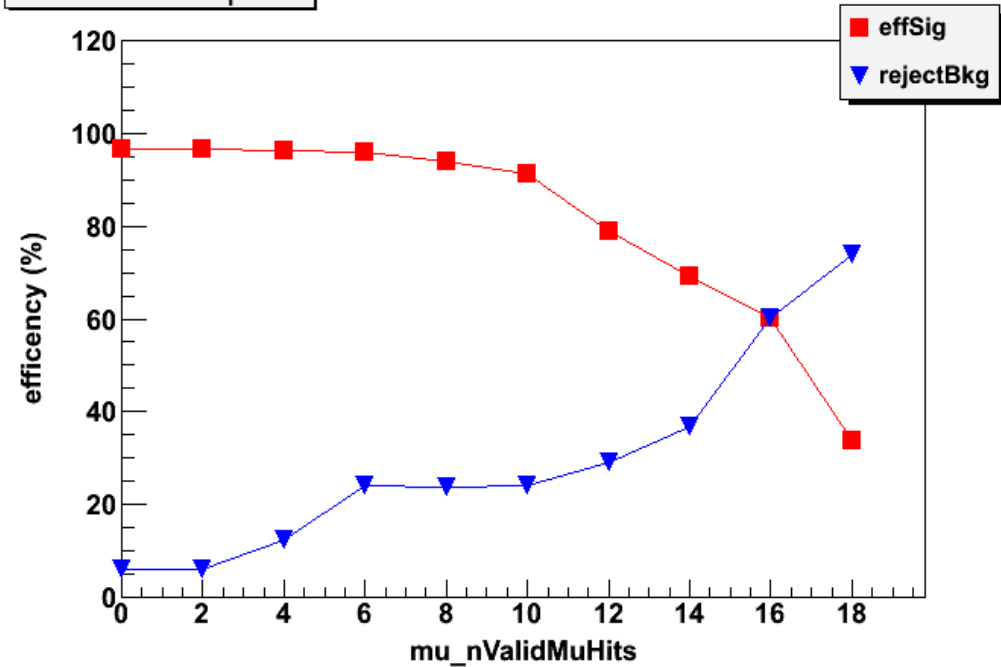
$|y| < 1.2, P_T > 0.0$



$1.2 < |y| < 1.6, P_T > 0.0$



$1.6 < |y| < 2.4, P_T > 0.0$



mu_validMuHits

$|y| < 1.2$

Cut value	0	2	4	6	8	10	12	14	16	18
Effi sig%	96.2	96.1	93.9	93.2	90.5	89.4	86.1	79.5	72.0	62.4
RejBkg%	16.9	16.9	18.6	20.3	39.1	38.5	37.4	36.4	52.8	68.4

$1.2 < |y| < 1.6$

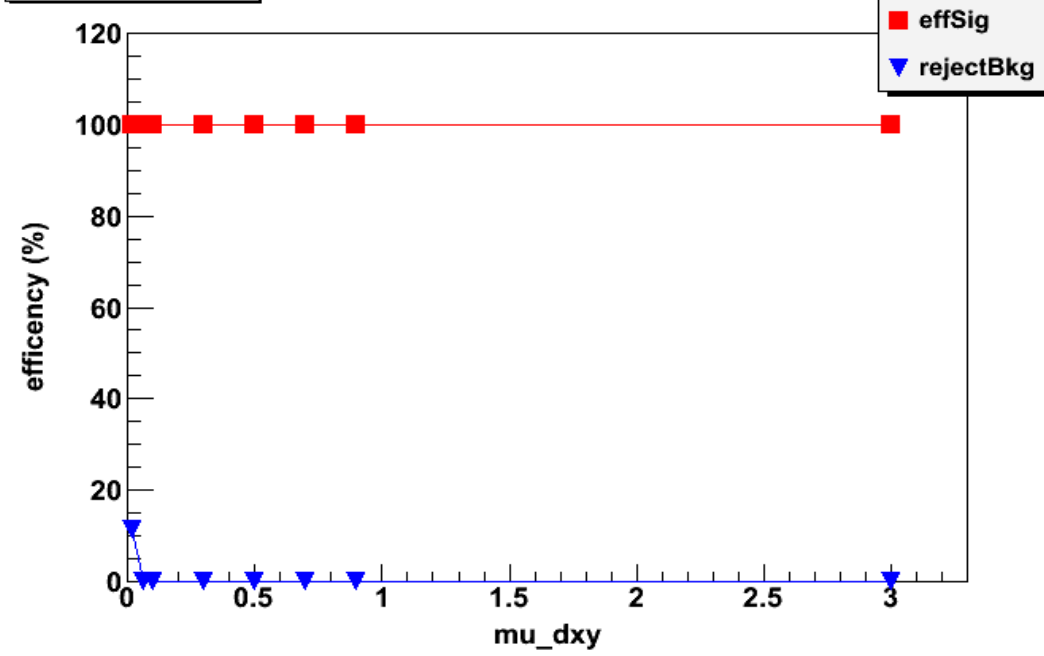
Cut value	0	2	4	6	8	10	12	14	16	18
Effi sig%	95.9	95.9	95.8	95.4	89.3	87.6	82.4	62.2	51.7	40.1
RejBkg%	4.14	4.14	4.34	4.75	11.0	12.6	17.8	37.9	48.3	59.6

$1.6 < |y| < 2.4$

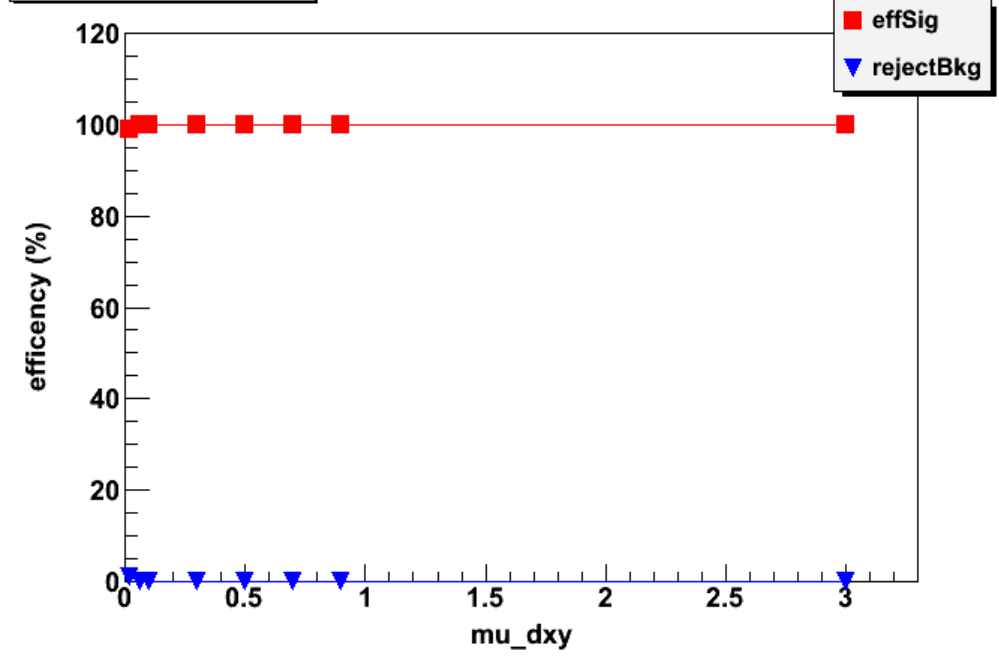
Cut value	0	2	4	6	8	10	12	14	16	18
Effi sig%	96.5	96.5	96.3	96.0	93.9	91.3	78.9	69.1	60.2	33.8
RejBkg%	5.89	5.89	12.2	24.1	23.8	23.9	29.0	36.7	60.2	73.9

mu_dxy

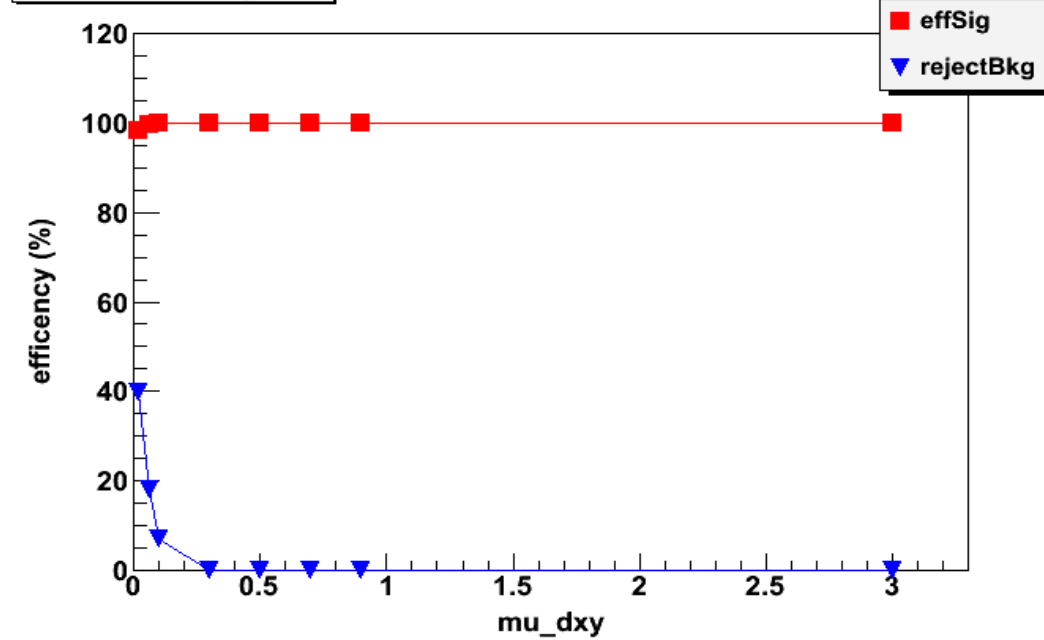
$|y| < 1.2, P_T > 0.0$



$1.2 < |y| < 1.6, P_T > 0.0$



$1.6 < |y| < 2.4, P_T > 0.0$



mu_dxy

$|y| < 1.2$

Cut value	0.02	0.06	0.1	0.3	0.5	0.7	0.9	3
Effi sig%	99.9	100	100	100	100	100	100	100
RejBkg	11.1	0	0	0	0	0	0	0

$1.2 < |y| < 1.6$

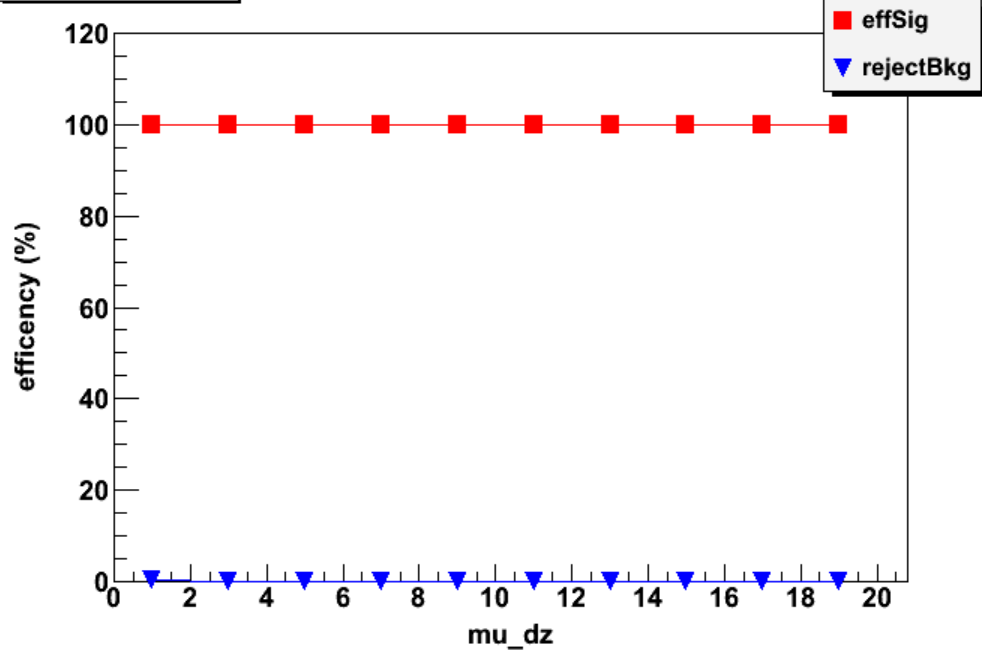
Cut value	0.02	0.06	0.1	0.3	0.5	0.7	0.9	3
Effi sig%	99.0	100	100	100	100	100	100	100
RejBkg	0.89	0	0	0	0	0	0	0

$1.6 < |y| < 2.4$

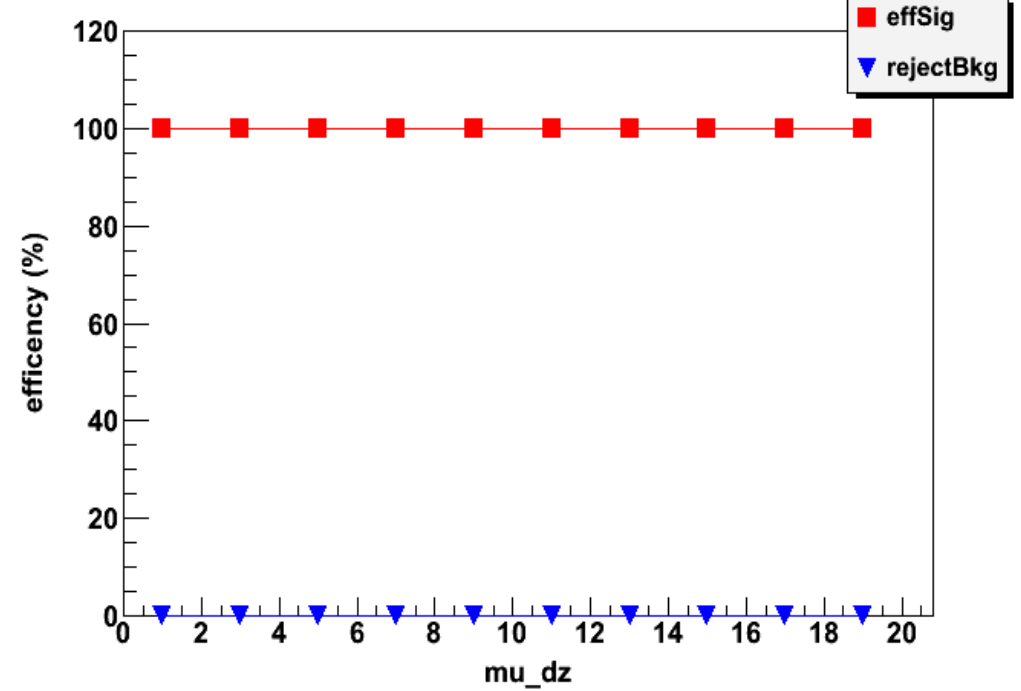
Cut value	0.02	0.06	0.1	0.3	0.5	0.7	0.9	3
Effi sig%	98.4	99.6	100	100	100	100	100	100
RejBkg	39.6	18.1	6.81	0	0	0	0	0

mu_dz

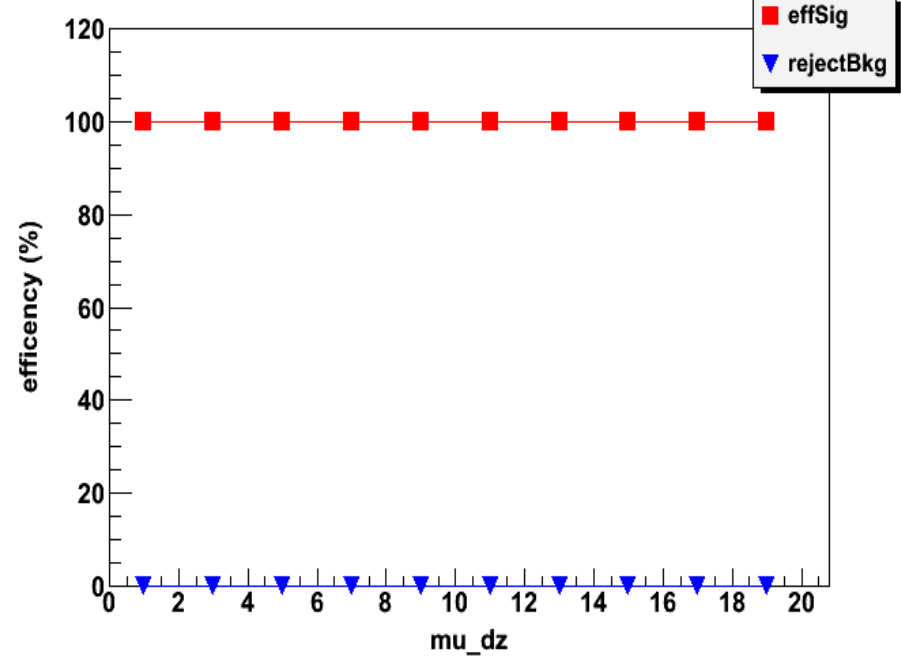
$|y| < 1.2, P_T > 0.0$



$1.2 < |y| < 1.6, P_T > 0.0$



$1.6 < |y| < 2.4, P_T > 0.0$



mu_dz

$|y| < 1.2$

Cut value	1	3	5	7	9	11	13	15	17	19
Effi sig%	100	100	100	100	100	100	100	100	100	100
RejBkg%	0.21	0	0	0	0	0	0	0	0	0

$1.2 < |y| < 1.6$

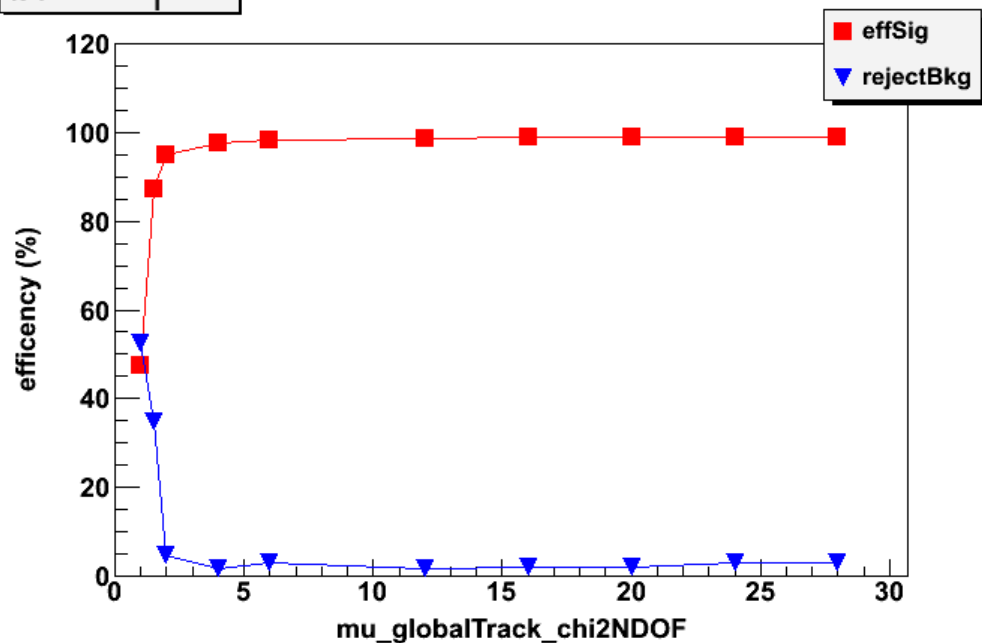
Cut value	1	3	5	7	9	11	13	15	17	19
Effi sig%	100	100	100	100	100	100	100	100	100	100
RejBkg%	0	0	0	0	0	0	0	0	0	0

$1.6 < |y| < 2.4$

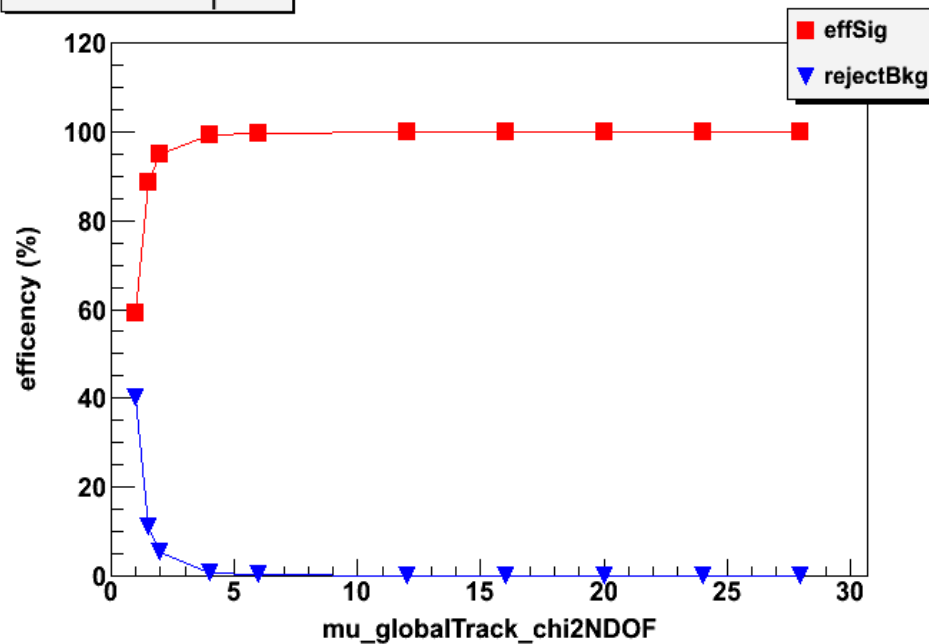
Cut value	1	3	5	7	9	11	13	15	17	19
Effi sig%	100	100	100	100	100	100	100	100	100	100
RejBkg%	0	0	0	0	0	0	0	0	0	0

mu_globalTrack_chi2NDOF

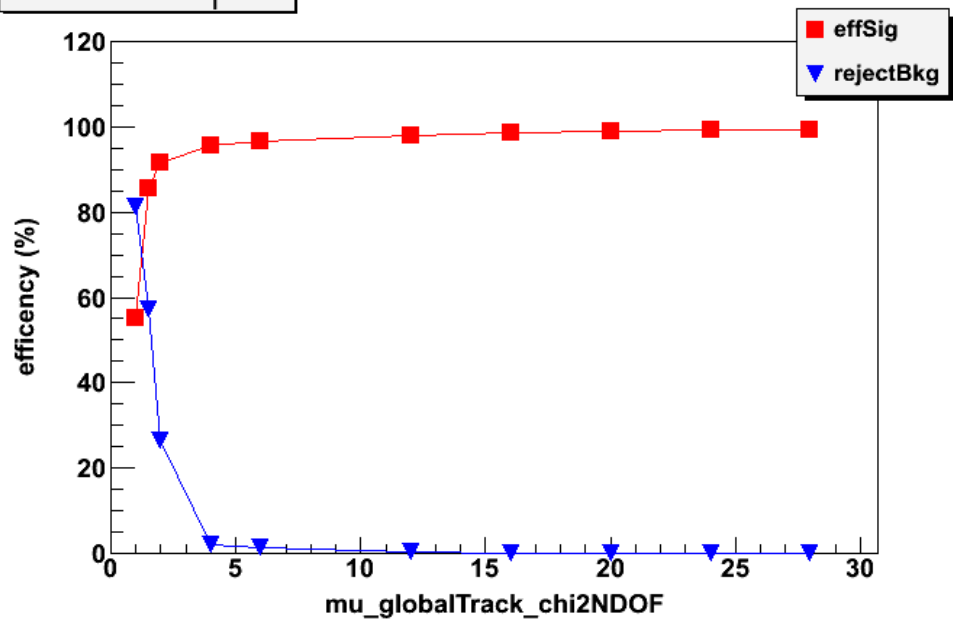
$|y| < 1.2, P_T > 0.0$



$1.2 < |y| < 1.6, P_T > 0.0$



$1.6 < |y| < 2.4, P_T > 0.0$



mu_globalTrack_chi2NDOF

$|y| < 1.2$

Cut value	1	1.5	2	4	6	12	16	20	24	28
Effi sig%	47.4	87.3	94.8	97.7	98.2	98.6	98.8	98.8	99.0	99.0
RejBkg%	52.4	34.7	4.60	1.48	3.12	1.63	2.07	1.79	2.82	2.82

$1.2 < |y| < 1.6$

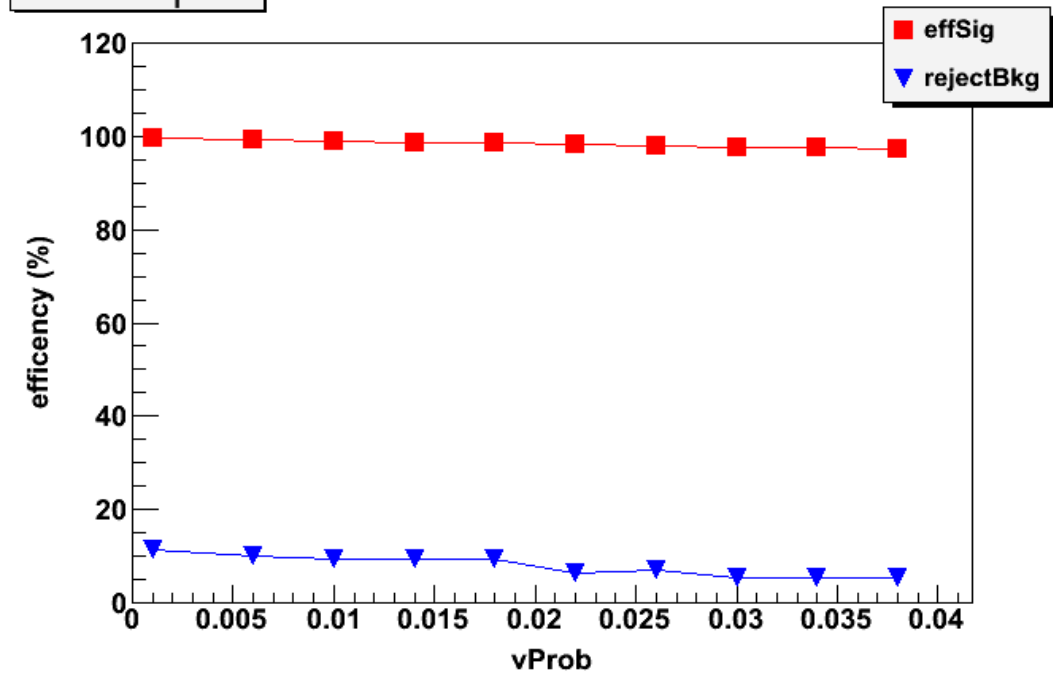
Cut value	1	1.5	2	4	6	12	16	20	24	28
Effi sig%	59.1	88.4	94.9	99.2	99.6	100	100	100	100	100
RejBkg%	40.1	11.1	5.17	0.69	0.30	0	0	0	0	0

$1.6 < |y| < 2.4$

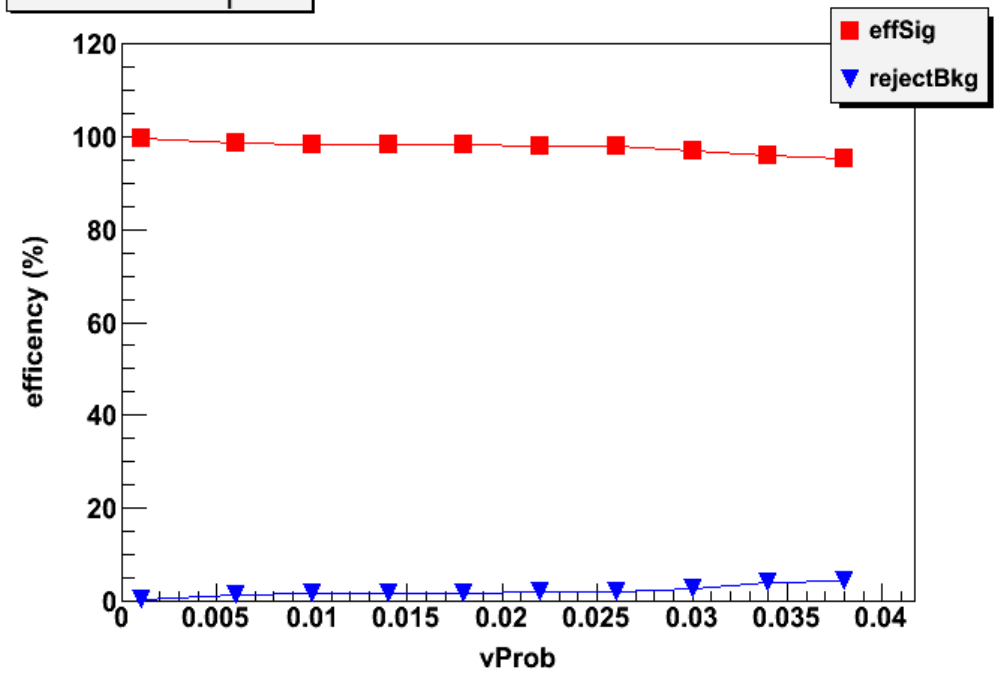
Cut value	1	1.5	2	4	6	12	16	20	24	28
Effi sig%	55.2	85.6	91.5	95.6	96.7	98.1	98.4	98.8	99.1	99.3
RejBkg%	81.2	57.1	26.4	2.04	1.13	0.28	0	0	0	0.01

vProb

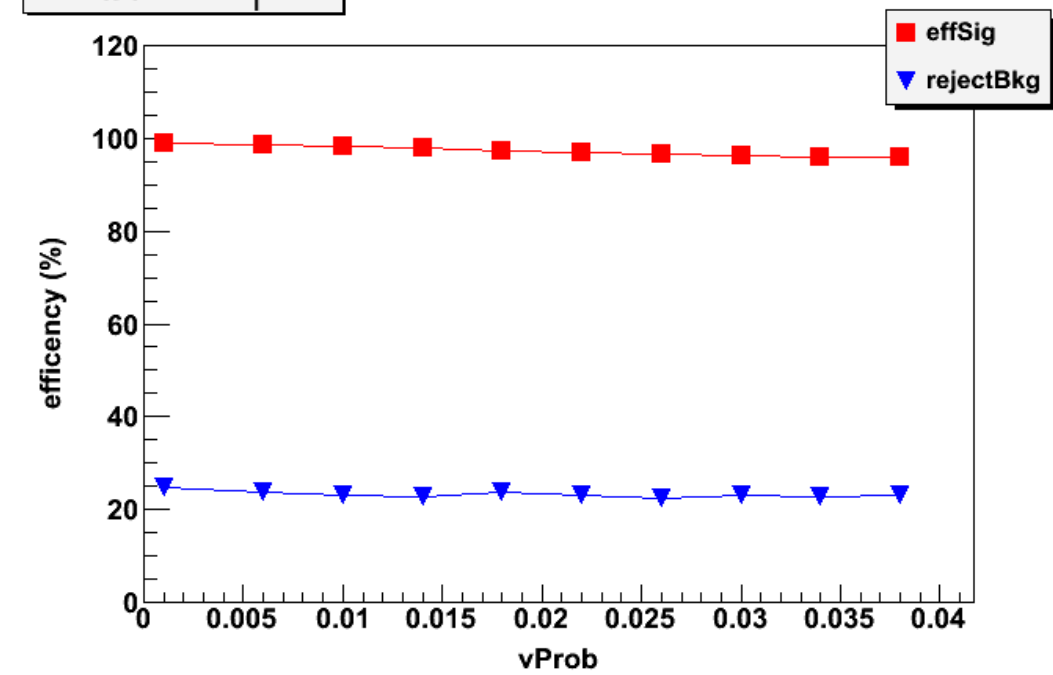
$|y| < 1.2, P_T > 0.0$



$1.2 < |y| < 1.6, P_T > 0.0$



$1.6 < |y| < 2.4, P_T > 0.0$



vProb **$|y| < 1.2$**

Cut value	0.001	0.006	0.01	0.014	0.018	0.022	0.026	0.03	0.034	0.038
Effi sig%	99.6	99.3	99.1	98.7	98.6	98.2	97.9	97.7	97.5	97.4
RejBkg%	11.3	10.1	9.40	9.27	9.25	6.22	6.82	5.43	5.24	5.36

 $1.2 < |y| < 1.6$

Cut value	0.001	0.006	0.01	0.014	0.018	0.022	0.026	0.03	0.034	0.038
Effi sig%	99.6	98.6	98.3	98.1	98.1	98.0	98.0	97.1	95.9	95.4
RejBkg%	0.35	1.22	1.48	1.65	1.65	1.85	1.85	2.75	3.83	4.36

 $1.6 < |y| < 2.4$

Cut value	0.001	0.006	0.01	0.014	0.018	0.022	0.026	0.03	0.034	0.038
Effi sig%	98.8	98.5	98.3	97.9	97.4	96.9	96.7	96.4	96.05	95.9
RejBkg%	24.8	23.5	22.99	22.7	23.7	22.9	22.3	22.9	22.7	22.9