Track Resolution Studies with the "LiC Detector Toy" MC Tool

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in collaboration with the SiLC R&D Project

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Detector description

Efficiency=95%

BARREL	*R[mm]*	*Zmin[mm]*	*Zmax[mm]*	*Error distribution*	*d[Xo]*	*Remarks*
Beam pipe	*15*			*passive*	*.00115*	*.4 mm Be*
VTX1	*16*	*-50*	*50*	*pads50*50 (25*25) equ. distrib.*	*.0020*	*wafer+ ladder*
VTX2	*26*	*-120*	*120*	*idem*	*idem*	*idem*
VTX3	*37*	*idem*	*idem*	*idem*	*idem*	*idem*
VTX4	*48*	*idem*	*idem*	*idem*	*idem*	*idem*
VTX5	*60*	*idem*	*idem*	*idem*	*idem*	*idem*
Support Structures	*90*	*-110*	*-90*	*passive*	*.0250*	*arbitrary*
idem	*idem*	*90*	*110*	*passive*	*idem*	*idem*
IT1	*150*	*-150*	*150*	*strips 2*50*	*.0175*	*10 deg.*
IT2	*290*	*-360*	*360*	*srips 2*50*	*.0175*	*idem*
TPC inn. wall	*300*	*-2160*	*2160*	*passive*	*.0150*	
100 pad rings	*<1580*	*idem*	*idem*	*sqrt(a1**2+a2**2*dz)*	*5*10**(-5)*	
FORWARD	*Z[mm]*	*Rmin[mm]*	*Rmax[mm]*	*Error distribution*	*d[Xo]*	*Remarks*
FTD1	*180*	*40*	*138*	*pads50*300*	*.01*	
FTD2	*300*	*48*	*140*	*idem*	*idem*	
FTD3	*450*	*58*	*280*	*idem*	*idem*	
FTD4	*800*	*88*	*idem*	*strips90*	*Idem*	*+- 45 d.*
FTD5	*1200*	*123*	*idem*	*idem*	*idem*	*idem*
FTD6	*1550*	*158*	*idem*	*idem*	*Idem*	*idem*
FTD7	*1900*	*188*	*idem*	*idem*	*idem*	*idem*

GUI

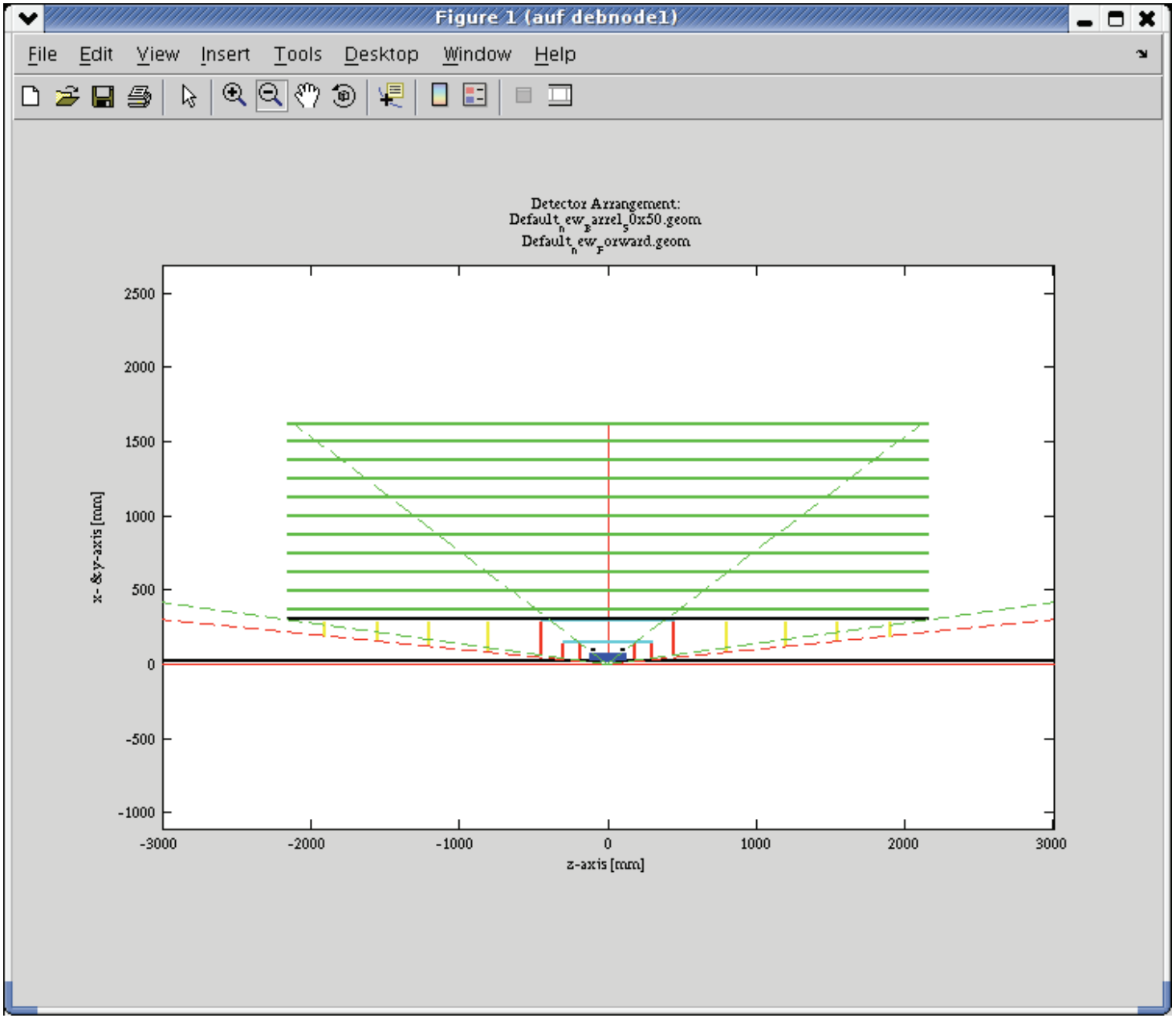


Figure 1 (auf debnode1)
File Edit View Insert Tools Desktop Window Help
Detector Arrangement:
Default_new_Barrel_50x50.geom
Default_new_Forward.geom
2500
2000
1500
1000
500
0
-500
-1000
x- &y-axis [mm]
-3000
-2000
-1000
0
1000
2000
3000
z-axis [mm]

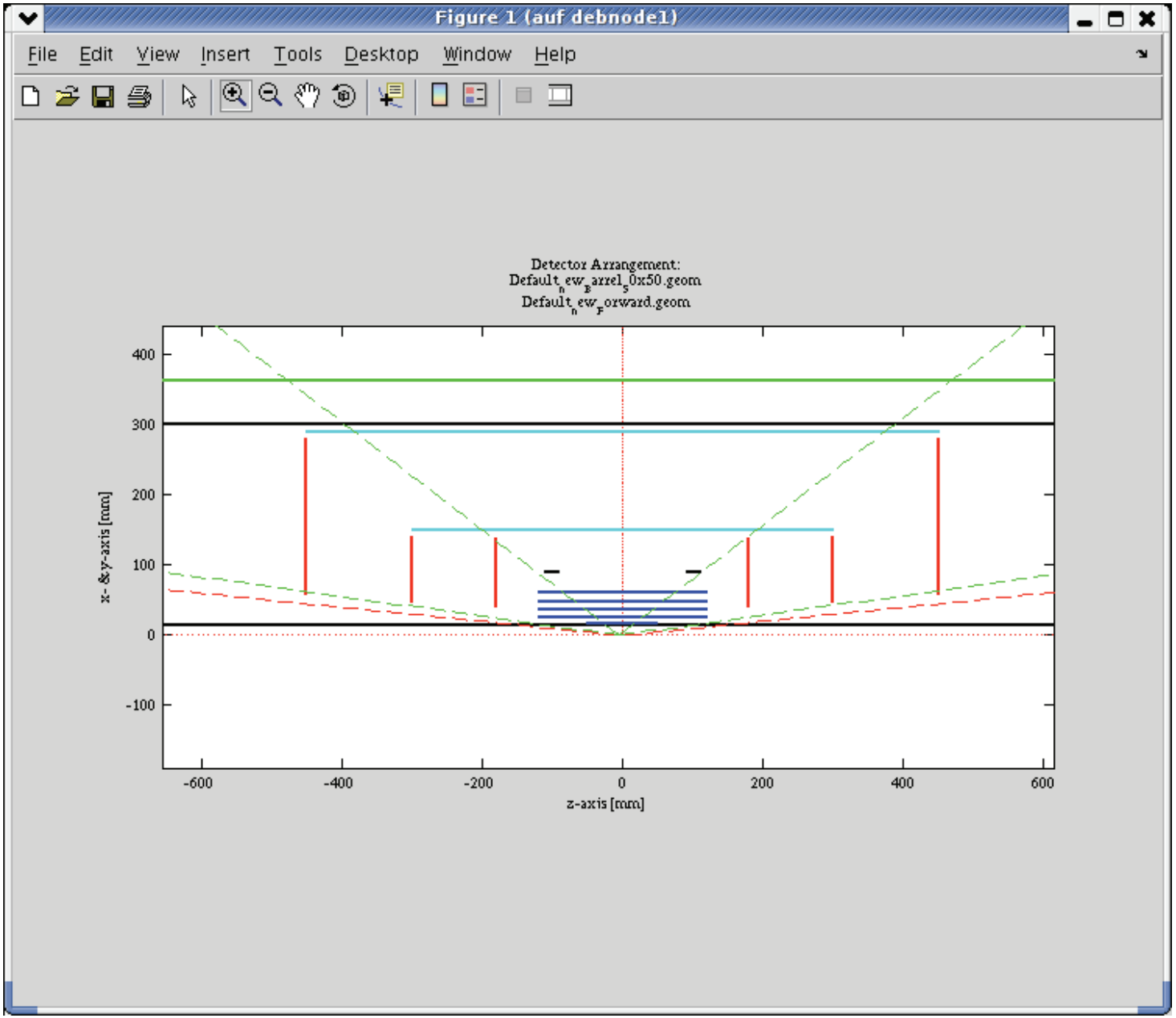
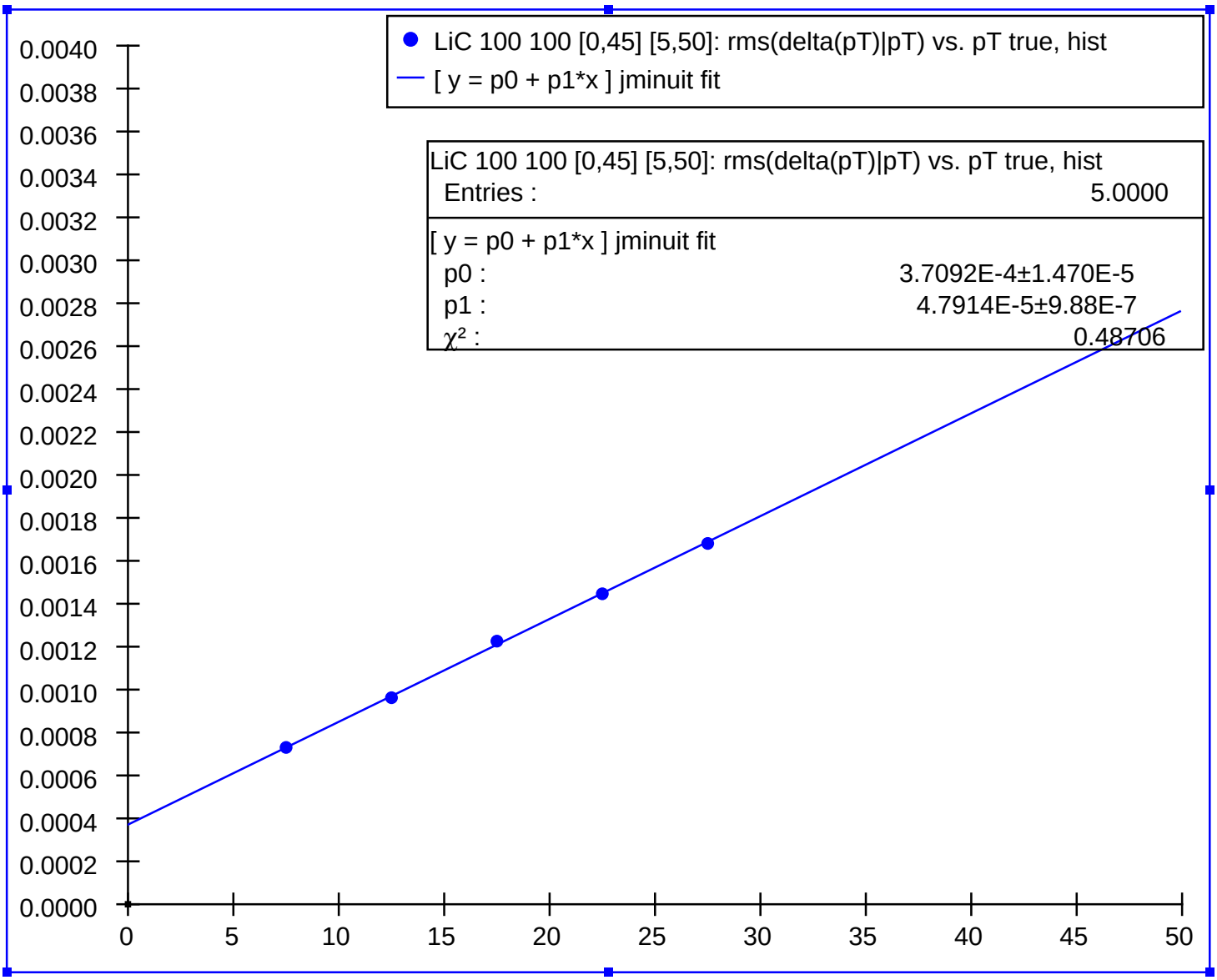
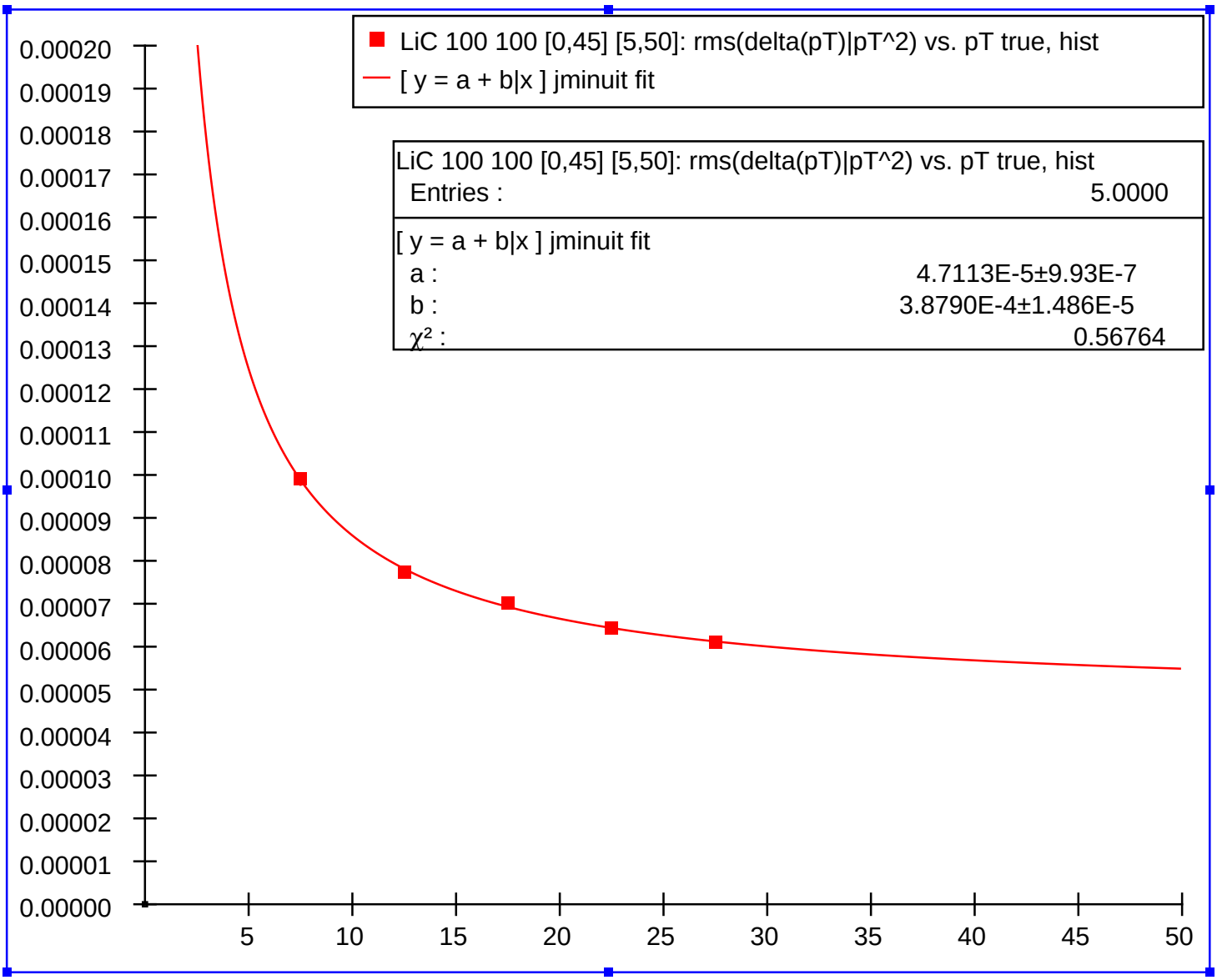


Figure 1 (auf debnode1)
File Edit View Insert Tools Desktop Window Help
Detector Arrangement:
Default_new_Barrel_50x50.geom
Default_new_Forward.geom
400
300
200
100
0
-100
x- & y-axis [mm]
-600
-400
-200
0
200
400
600
z-axis [mm]

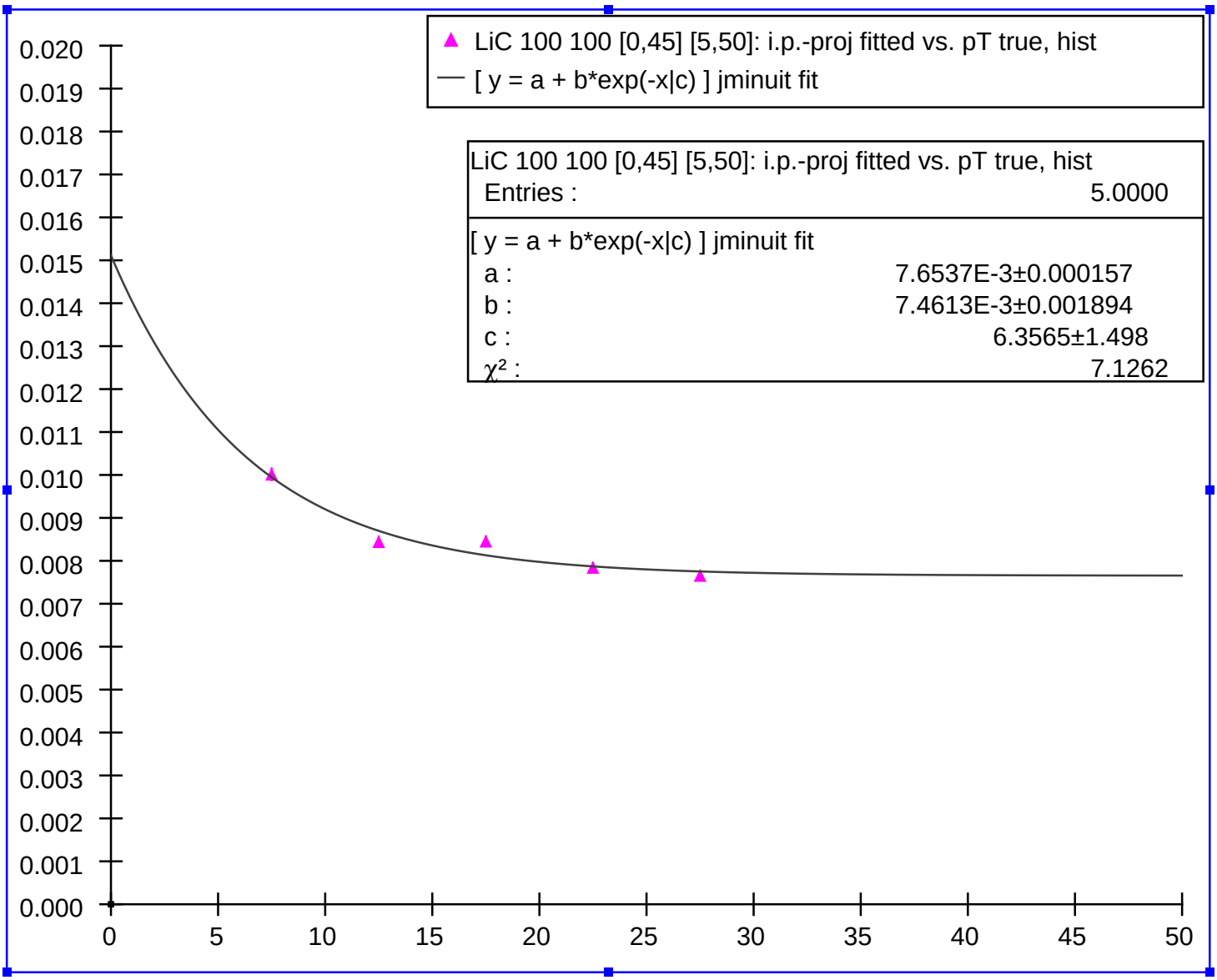
LiC 100 100 [0,45] [5,50]: rms(delta(pT)|pT) vs. pT true

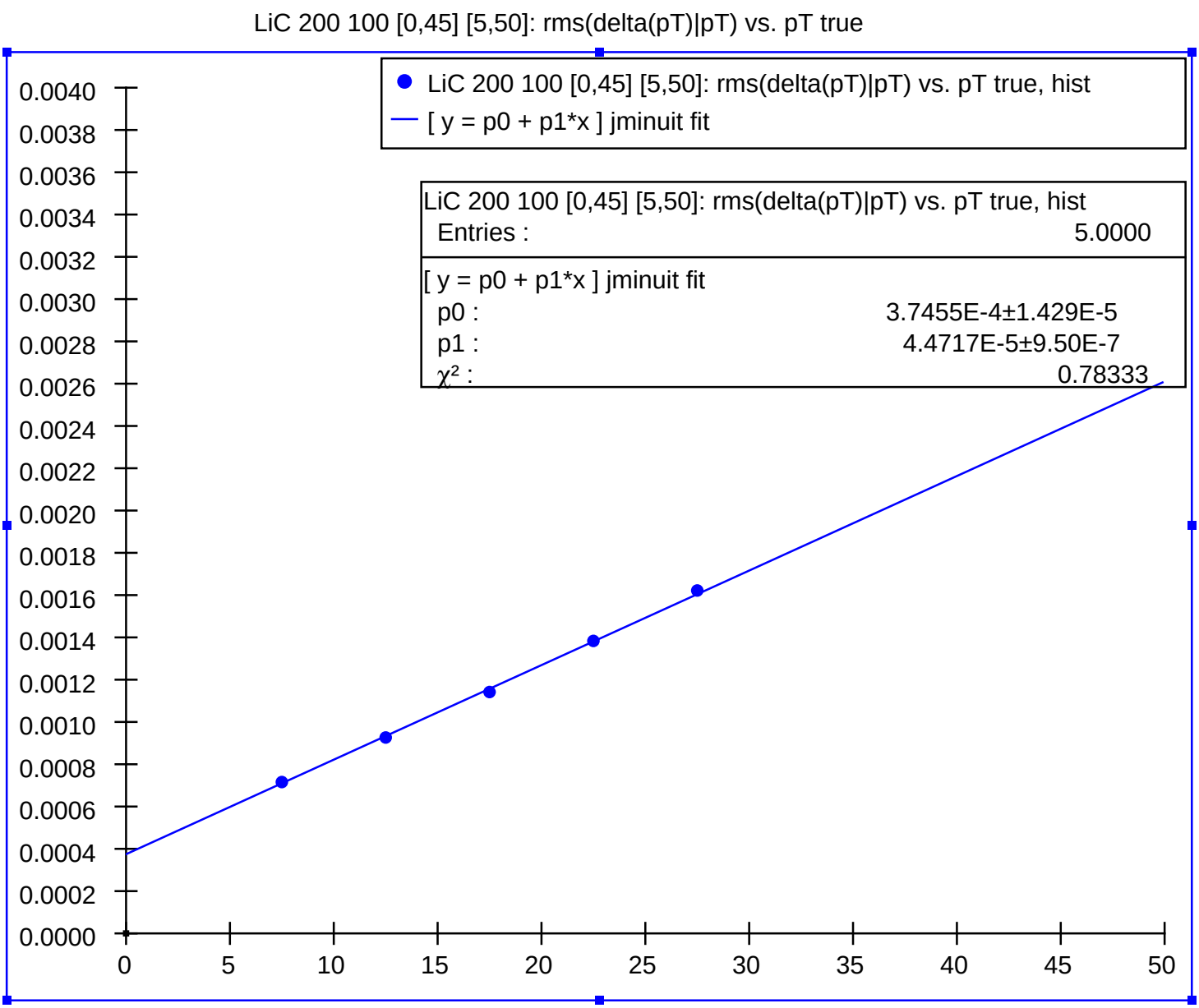


LiC 100 100 [0,45] [5,50]: rms(delta(pT)|pT^2) vs. pT true

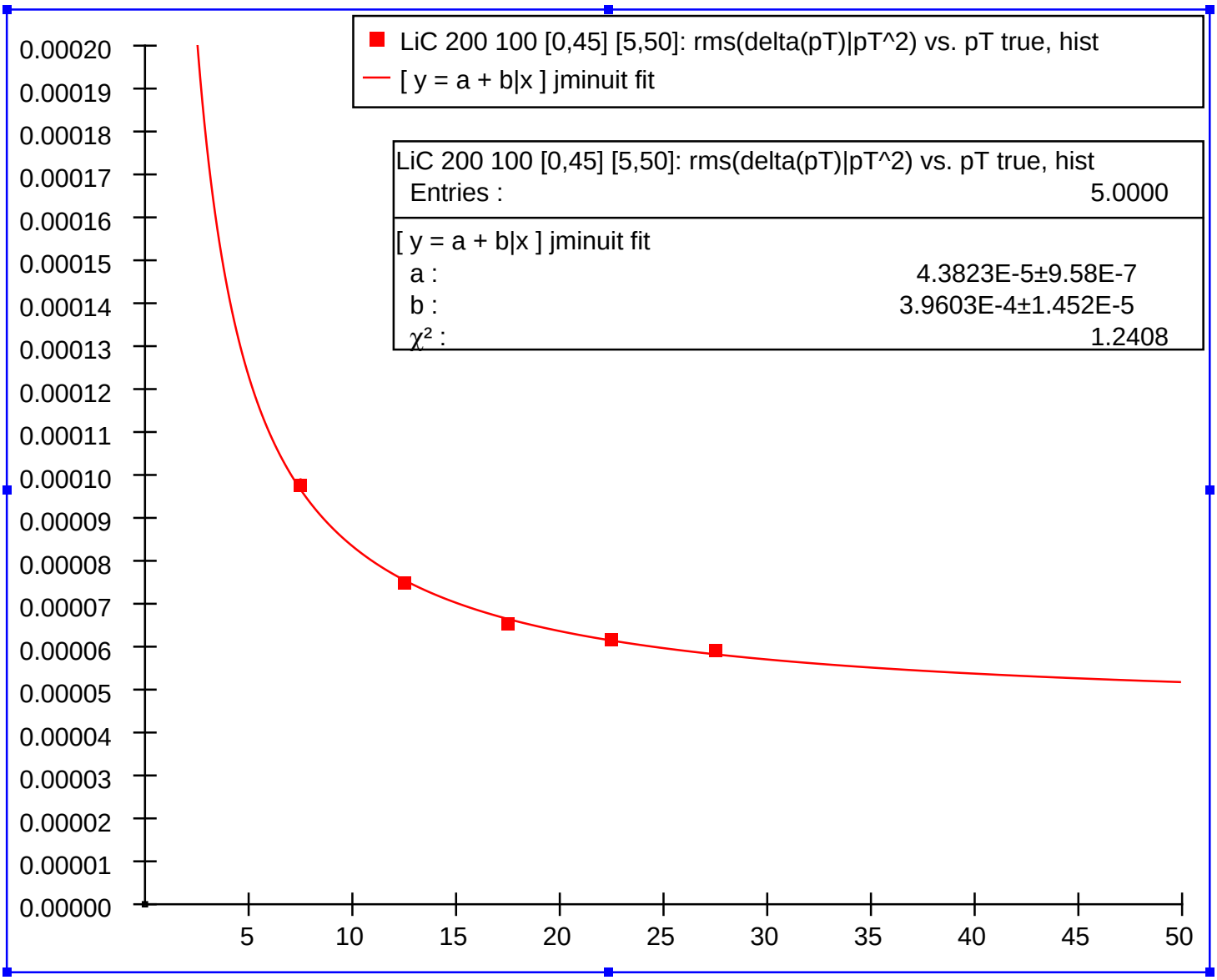


LiC 100 100 [0,45] [5,50]: i.p.-proj fitted vs. pT true

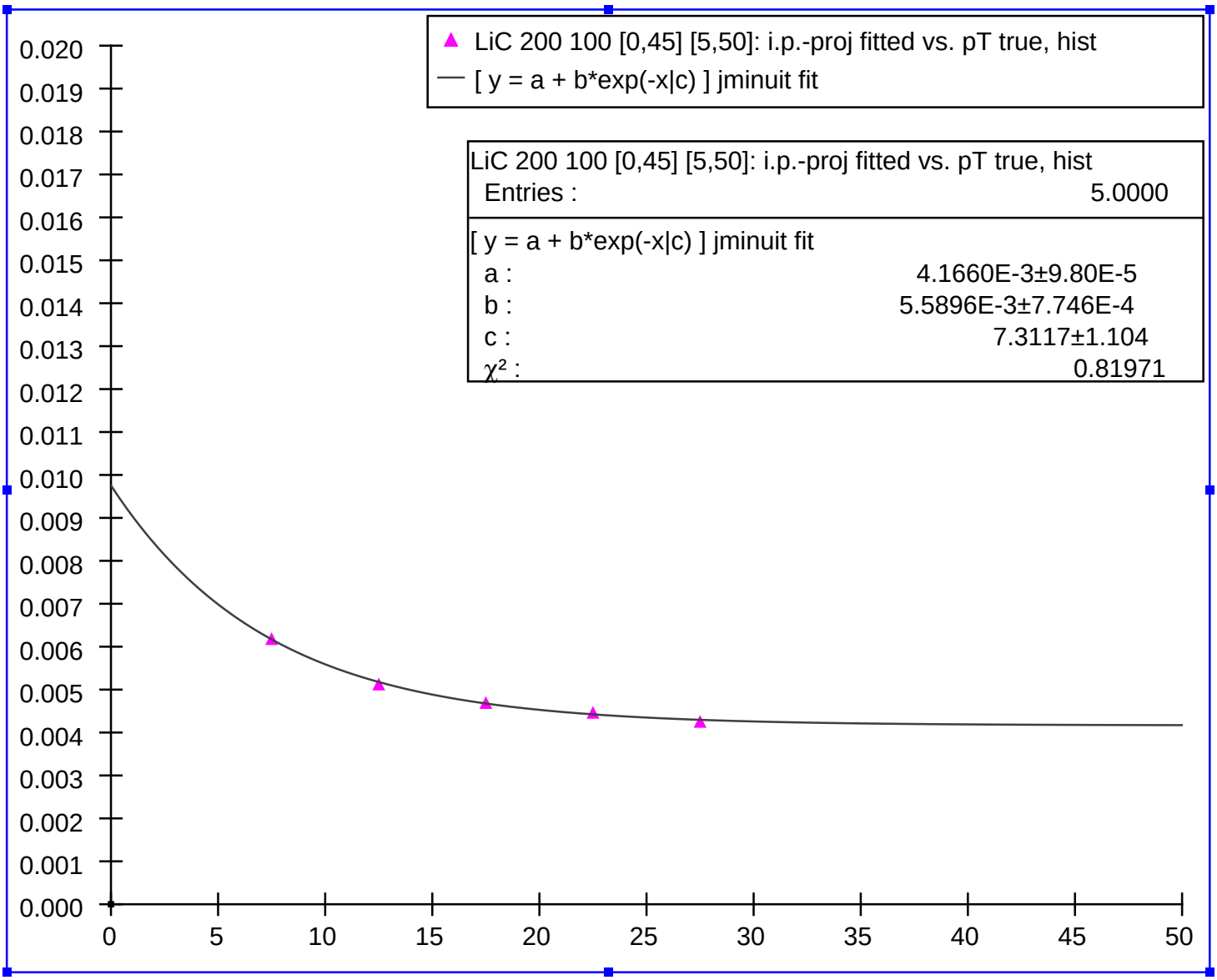



LiC 200 100 [0,45] [5,50]: rms(delta(pT)|pT) vs. pT true
LiC 200 100 [0,45] [5,50]: rms(delta(pT)|pT) vs. pT true, hist
[y = p0 + p1*x] jminuit fit
LiC 200 100 [0,45] [5,50]: rms(delta(pT)|pT) vs. pT true, hist
Entries : 5.0000
[y = p0 + p1*x] jminuit fit
p0 : 3.7455E-4±1.429E-5
p1 : 4.4717E-5±9.50E-7
χ² : 0.78333
0.0040
0.0038
0.0036
0.0034
0.0032
0.0030
0.0028
0.0026
0.0024
0.0022
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
0
5
10
15
20
25
30
35
40
45
50

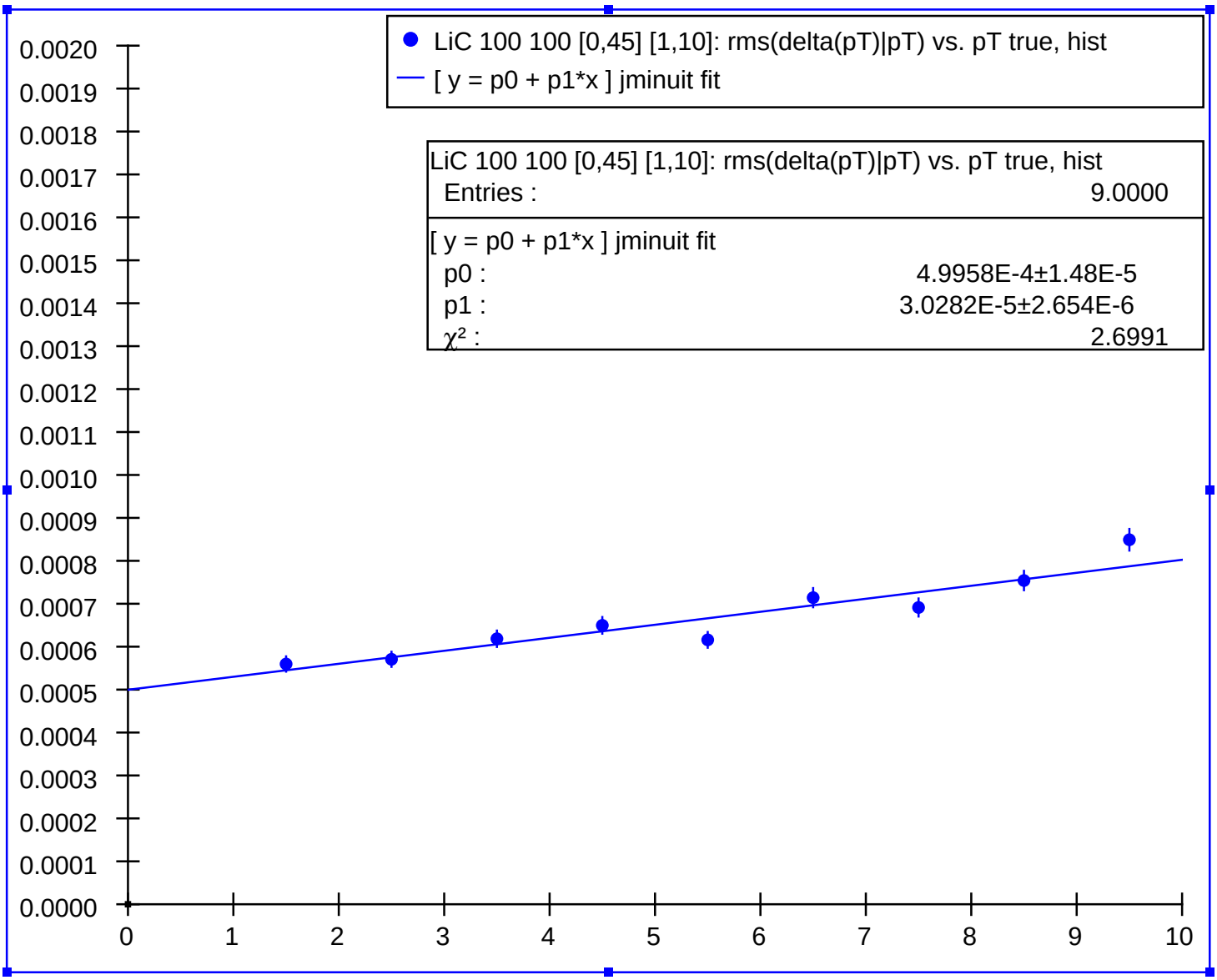
LiC 200 100 [0,45] [5,50]: rms(delta(pT)|pT^2) vs. pT true



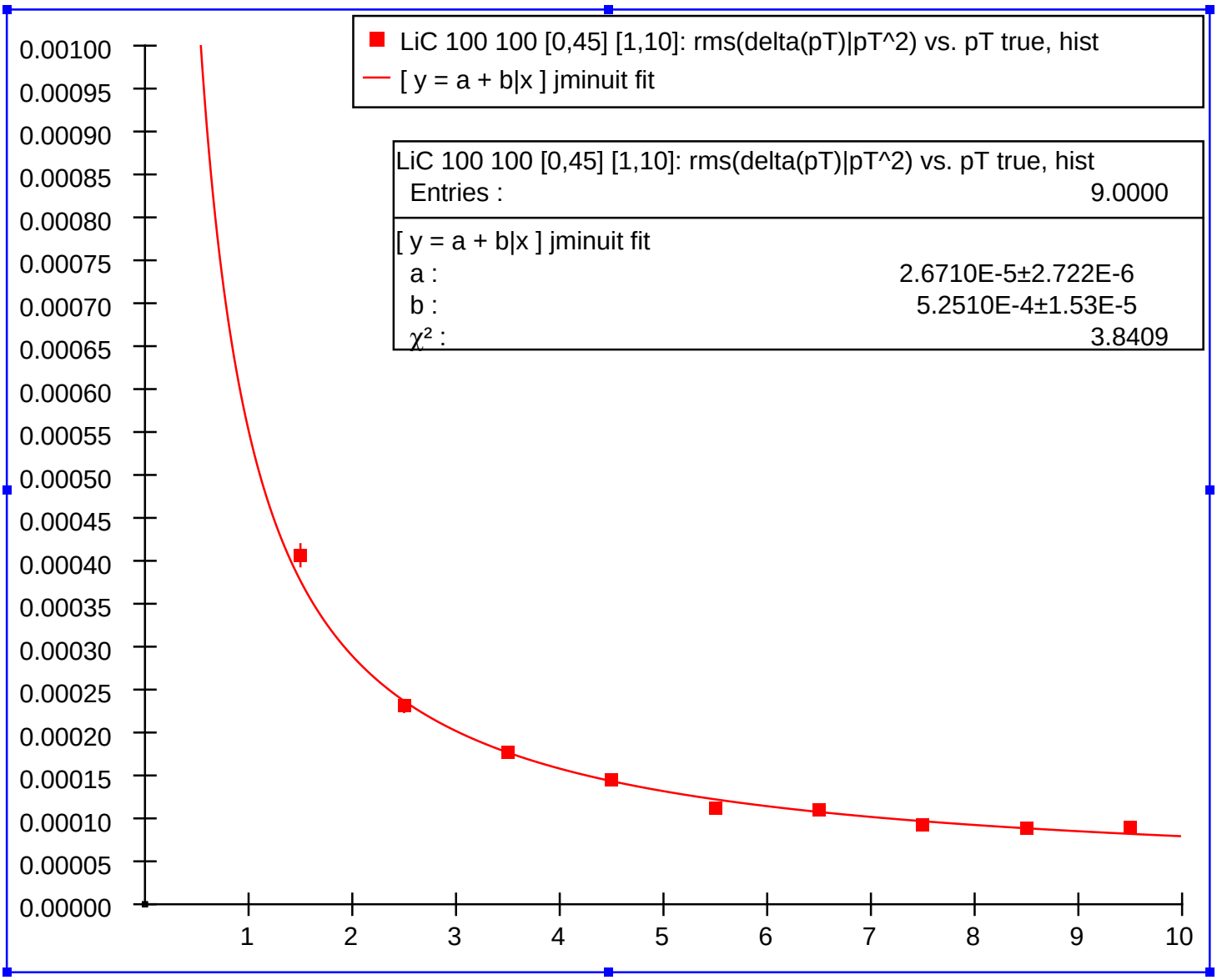
LiC 200 100 [0,45] [5,50]: i.p.-proj fitted vs. pT true



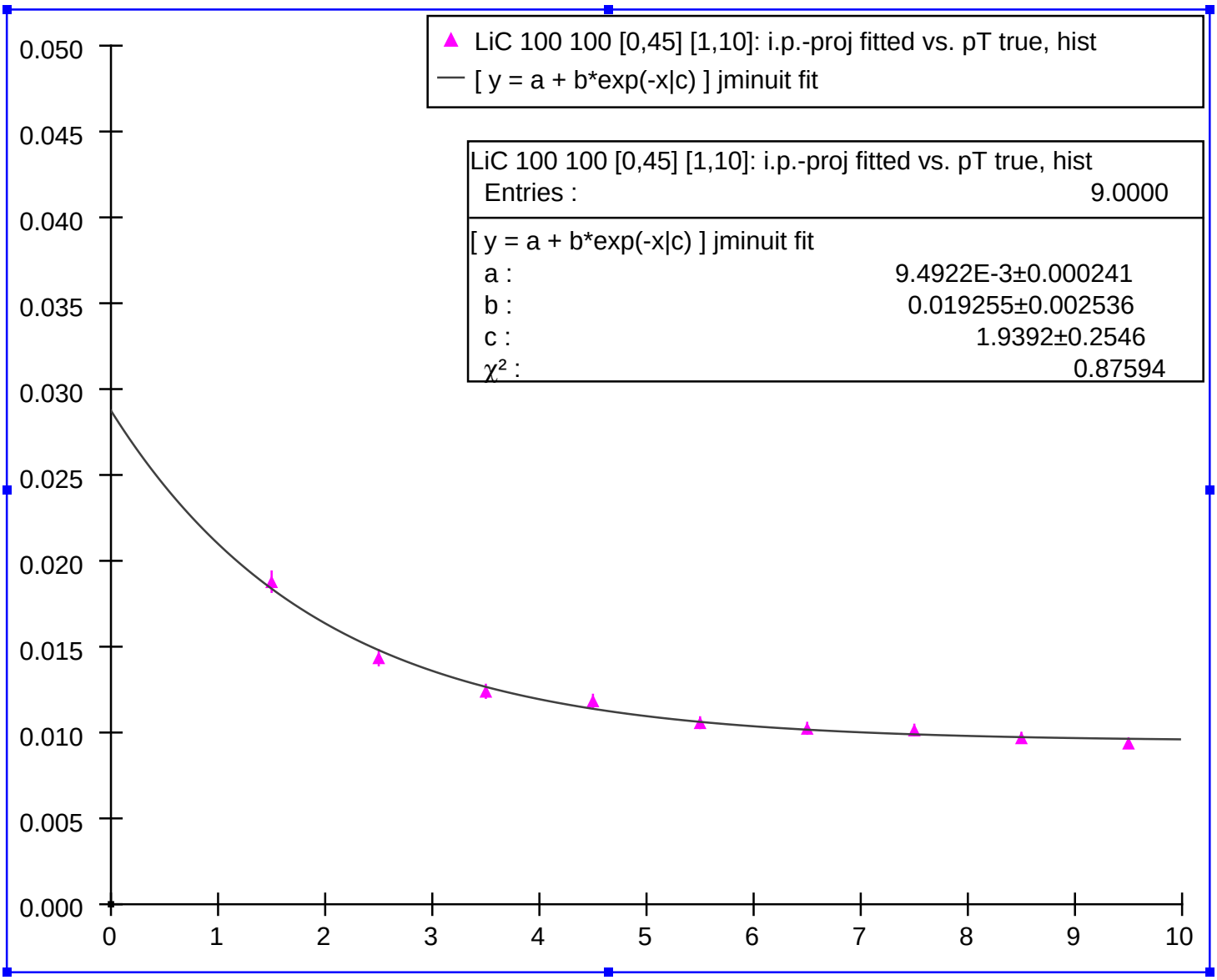
LiC 100 100 [0,45] [1,10]: rms(delta(pT)|pT) vs. pT true



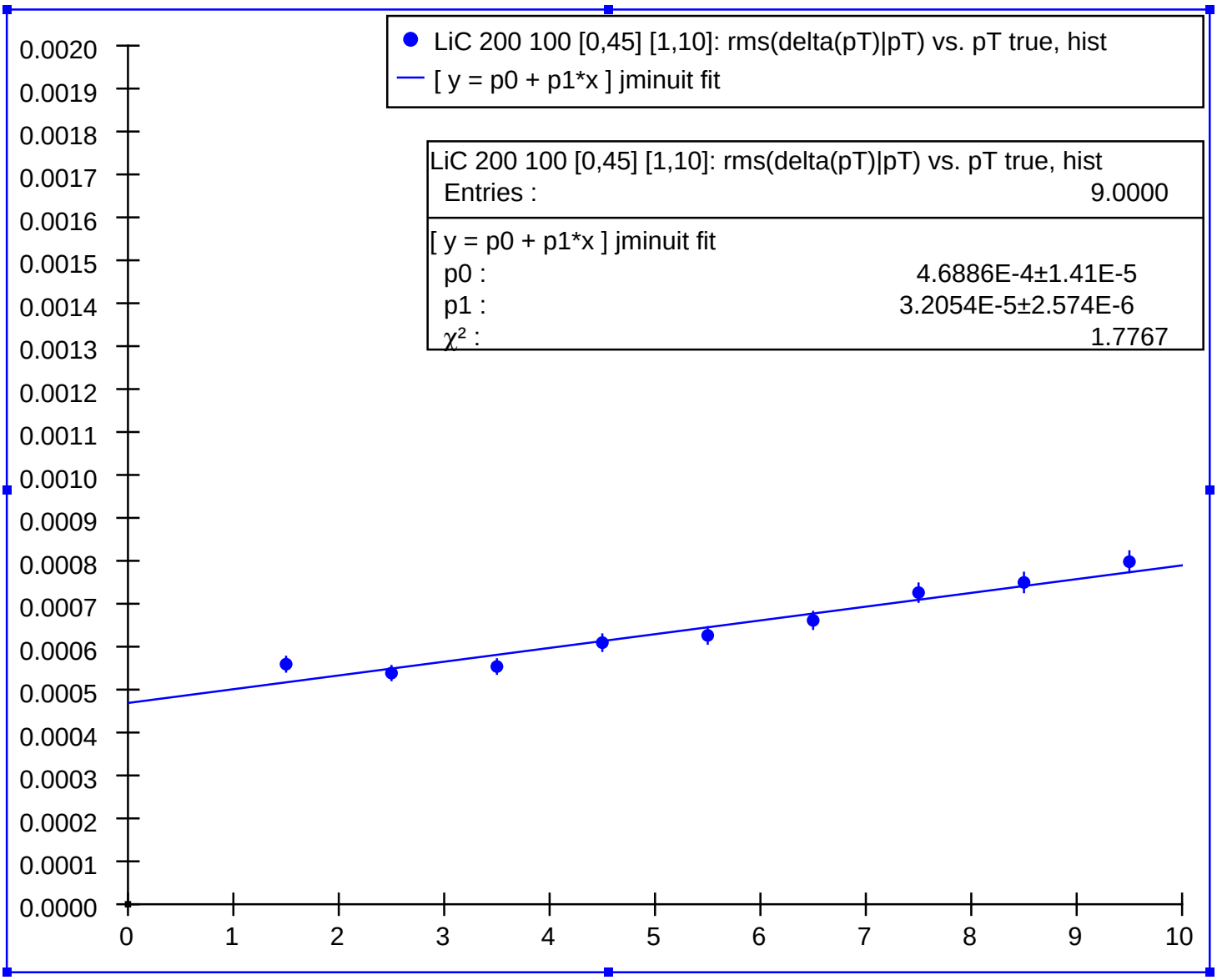
LiC 100 100 [0,45] [1,10]: rms(delta(pT)|pT^2) vs. pT true



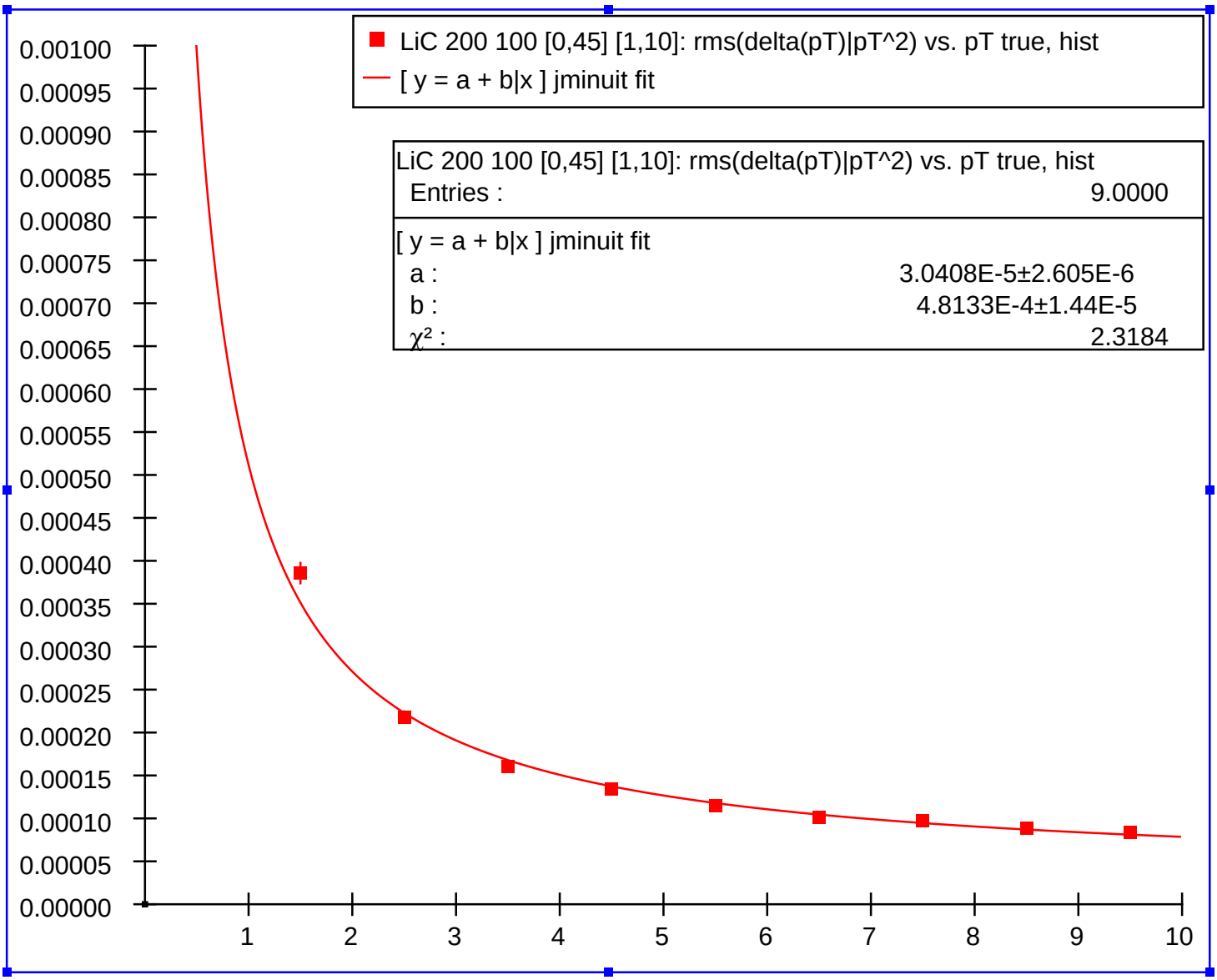
LiC 100 100 [0,45] [1,10]: i.p.-proj fitted vs. pT true



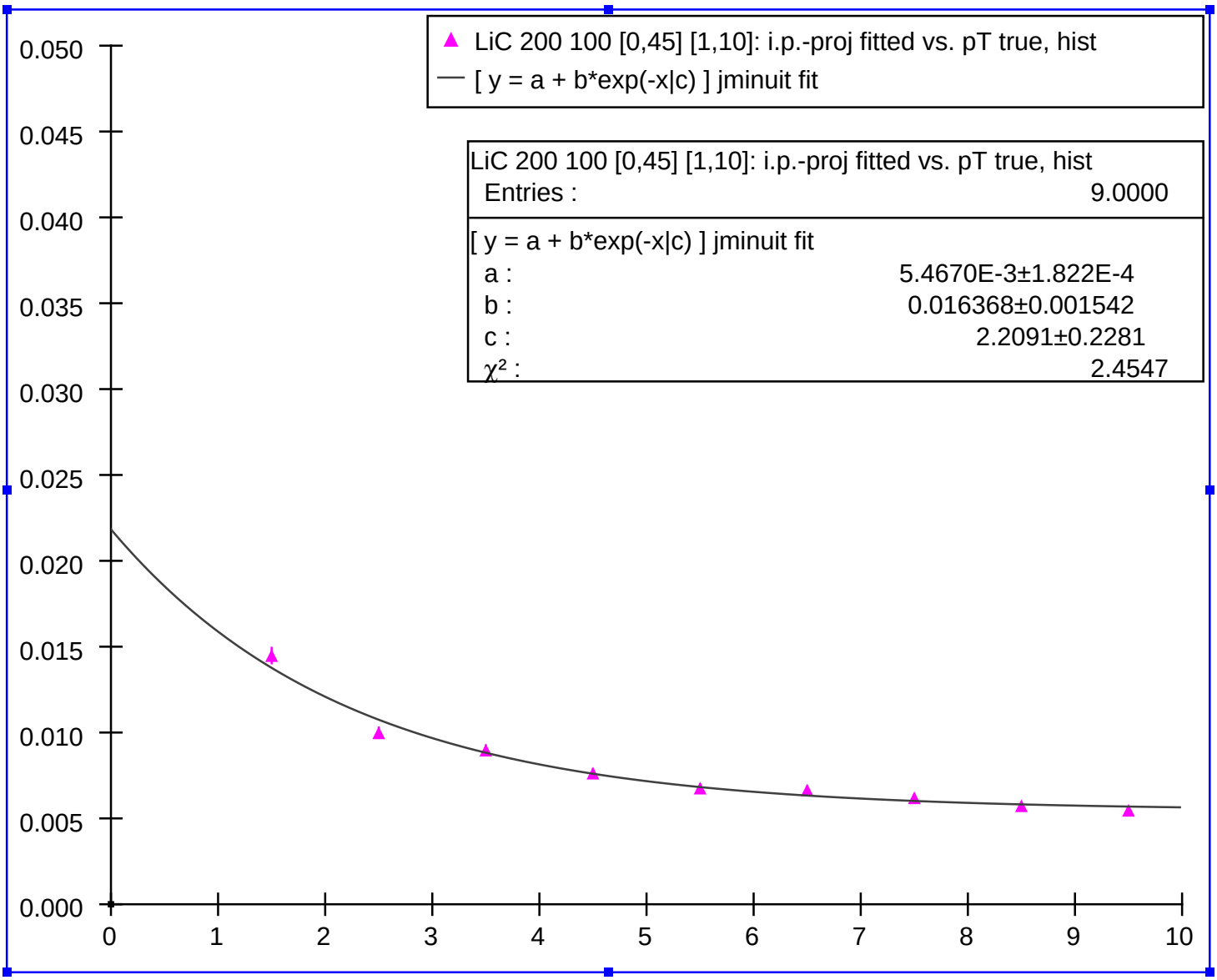
LiC 200 100 [0,45] [1,10]: rms(delta(pT)|pT) vs. pT true



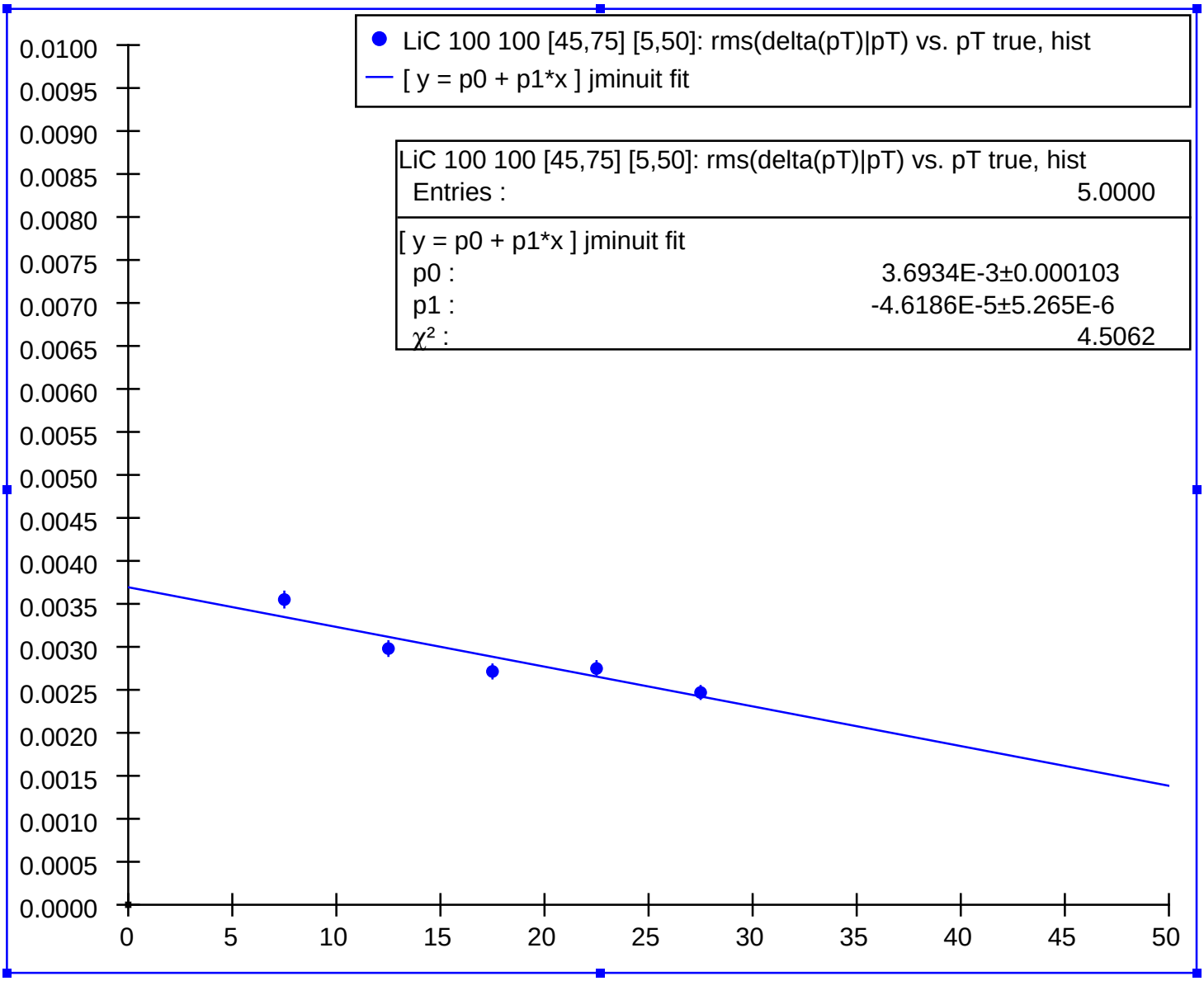
LiC 200 100 [0,45] [1,10]: rms(delta(pT)|pT^2) vs. pT true



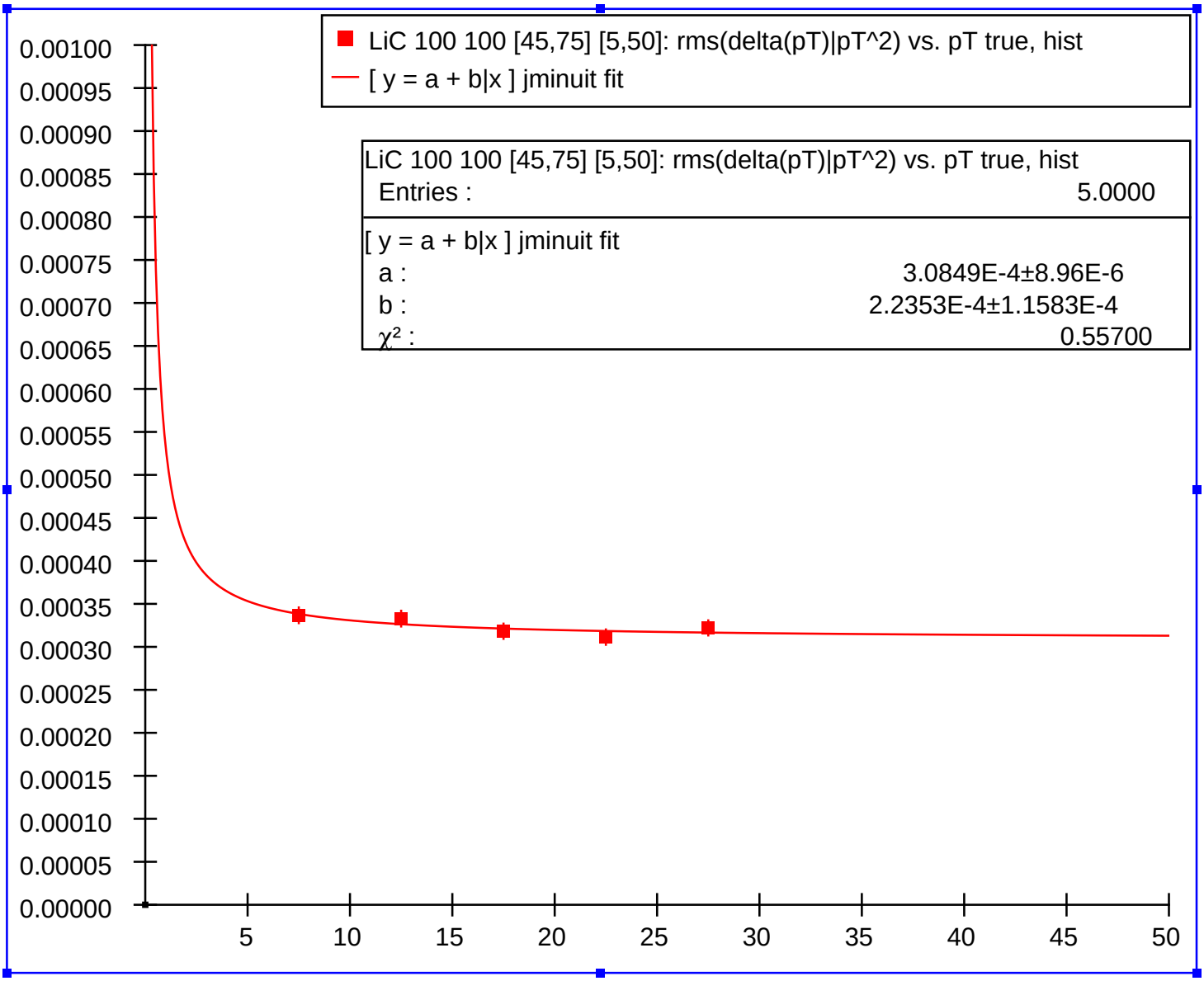
LiC 200 100 [0,45] [1,10]: i.p.-proj fitted vs. pT true



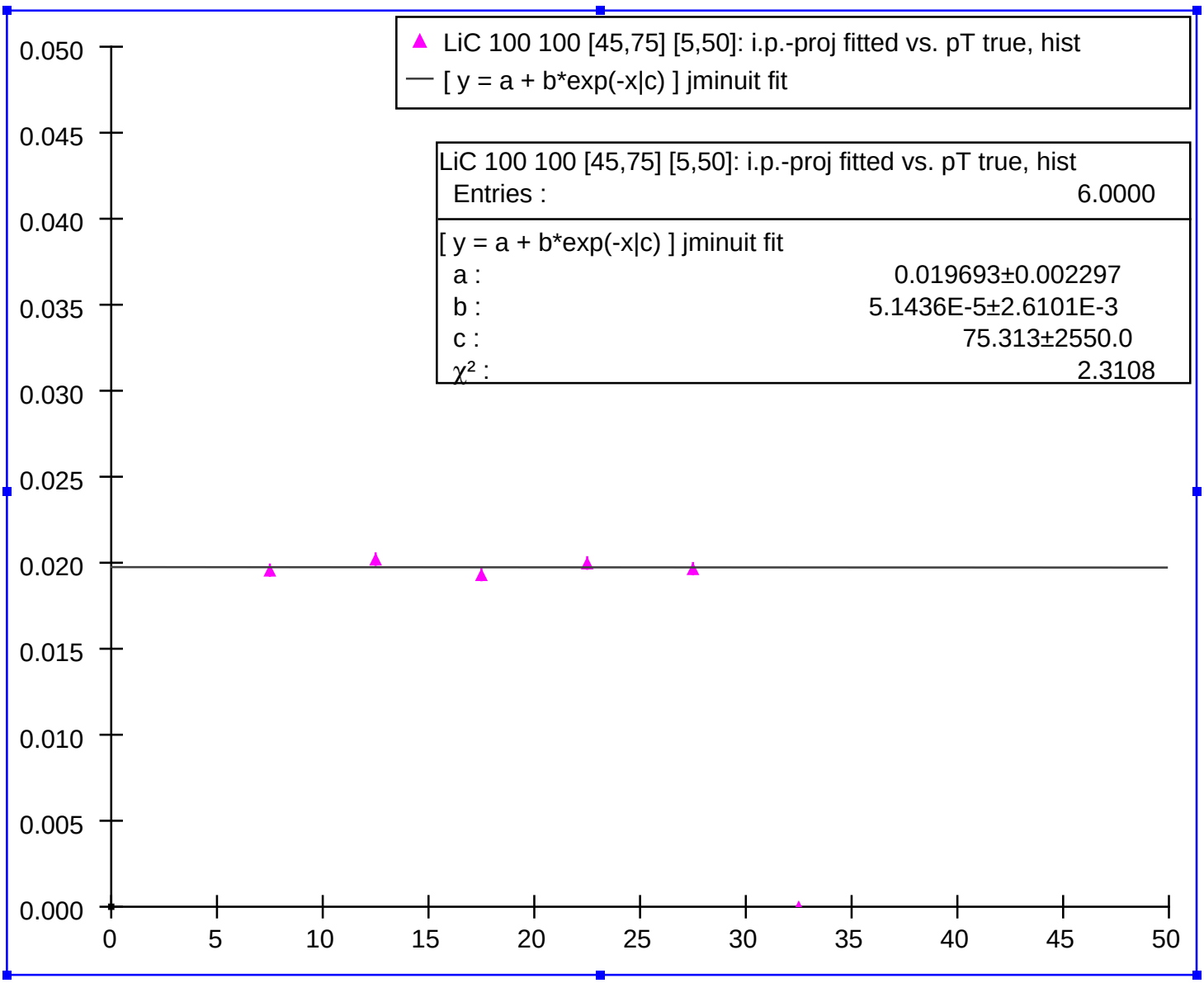
LiC 100 100 [45,75] [5,50]: rms(delta(pT)|pT) vs. pT true



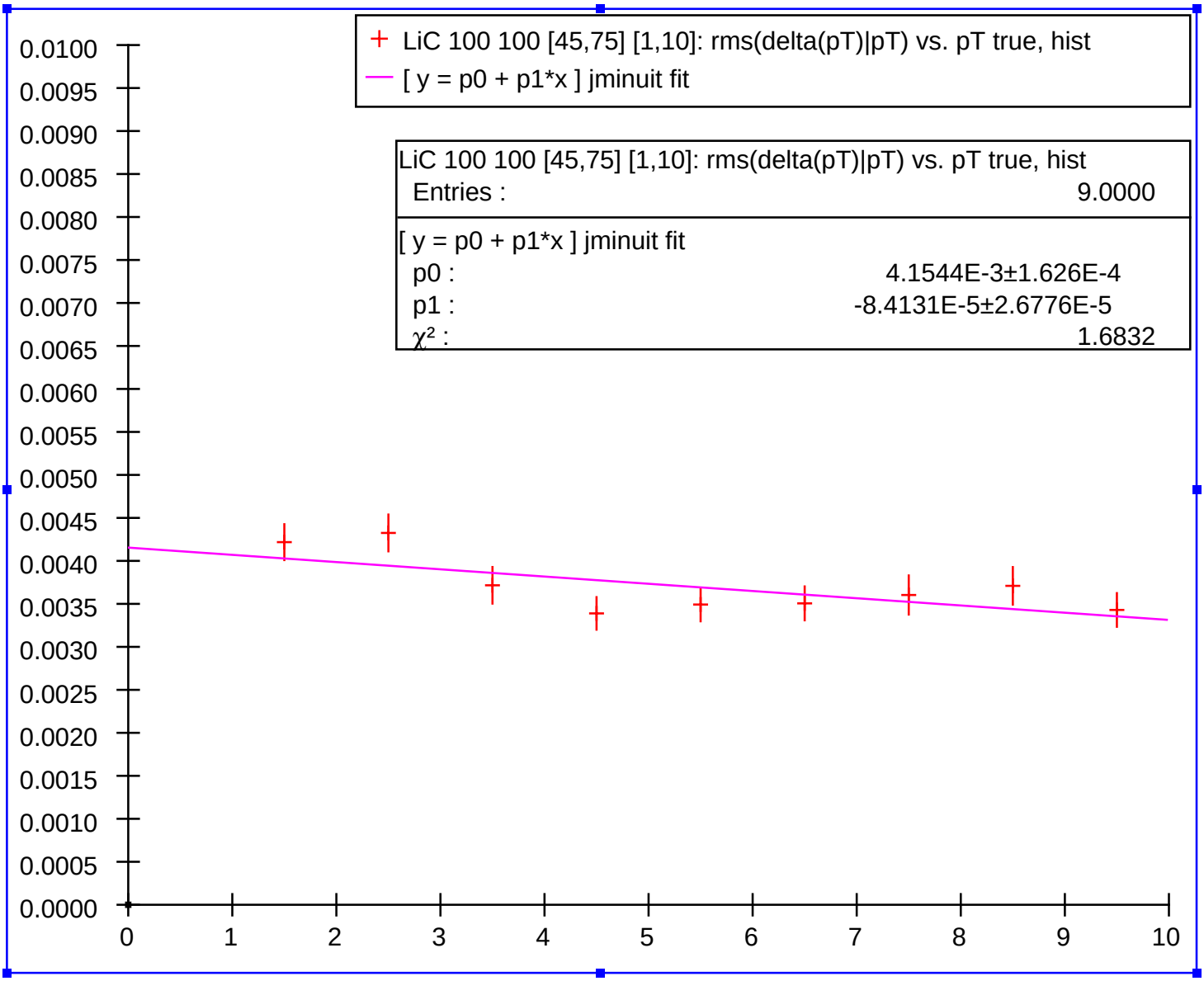
LiC 100 100 [45,75] [5,50]: rms(delta(pT)|pT^2) vs. pT true



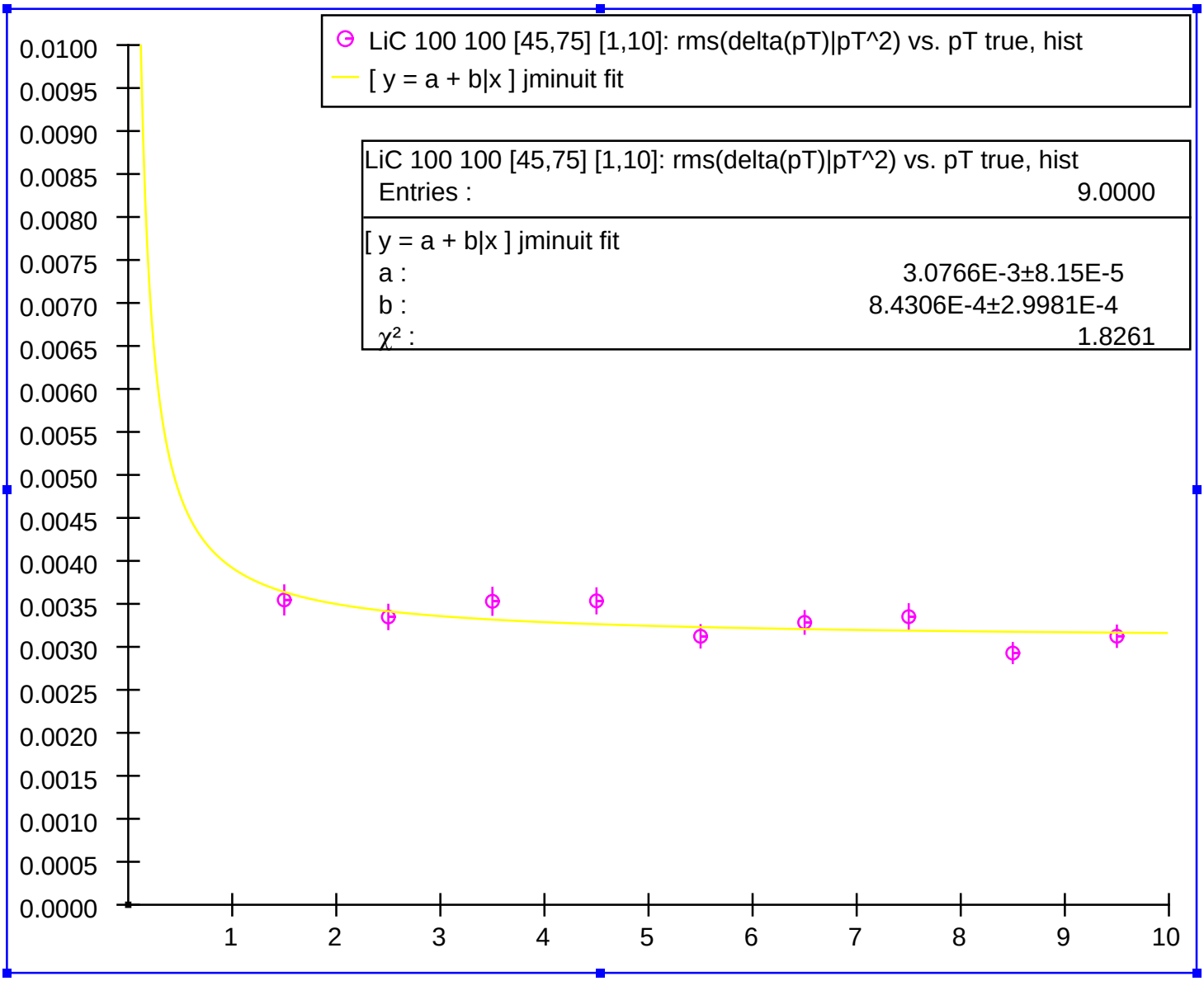
LiC 100 100 [45,75] [5,50]: i.p.-proj fitted vs. pT true



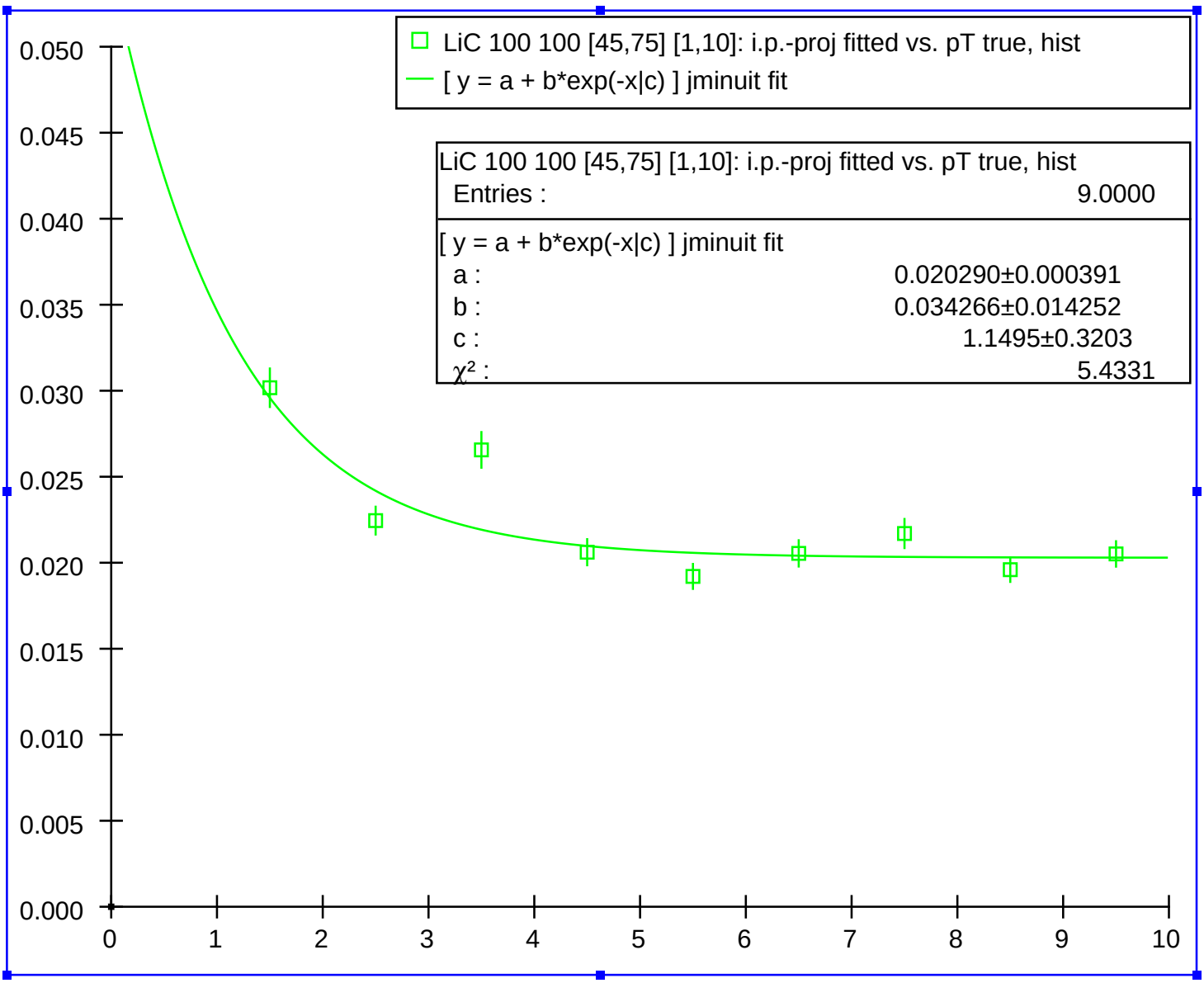
LiC 100 100 [45,75] [1,10]: rms(delta(pT)|pT) vs. pT true



LiC 100 100 [45,75] [1,10]: rms(delta(pT)|pT^2) vs. pT true



LiC 100 100 [45,75] [1,10]: i.p.-proj fitted vs. pT true



Explanation of the plots

LiC 100 100 = 50 * 50 μm pixels

LiC 200 100 = 25 * 25 μm pixels

[0,45] = dip angle | λ | range = "barrel"

[45,75] = dip angle | λ | range = "forward"

[5,50] = p_T range = 5 … 30 GeV

[1,10] = p_T range = 1 … 10 GeV

shown: $\Delta p_T/p_T$, $\Delta p_T/p_T^2$, impact parameter (xy proj.)