



Numbers initially seen in Rows 6-12, Columns C-N are placeholders only. Please overwrite them as you enter actual data.														Cells below (Columns O, P, and Q) contain formulas. Do not overwrite!			
merged	Entry	Background (enter a 1)	Signal Event Slice No.	Muon KE (MeV)	v/c	px (MeV/c)	py (MeV/c)	pz (MeV/c)	Proton KE (MeV)	v/c	px (MeV/c)	py (MeV/c)	pz (MeV/c)	Net px (MeV/c)	Net py (MeV/c)	Net pz (MeV/c)	nu-beam pz (MeV/c)
28	39																
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28	50																
29	0	1															
29	1	1															
29	2	1															
29	3		16	5.146.17	0.999600064	319.189043	-356.3380206	5.228.28	143.4997893	0.8877612663	-180.8873647	453.8820945	218.2044895	128.30	97.25	5.448.49	
29	4		8	5.178.91	0.9996025396	542.4356342	-19.84498005	5.254.91	172.8715735	0.5336612933	-512.0970444	54.16853941	208.724327	30.34	34.22	5.553.64	
29	5		5	3.565.17	0.999597289	211.7731173	515.7477452	3.656.41	404.6807914	0.7154735249	-452.0315813	-408.5646511	685.4597762	-240.26	17.18	4.341.87	
29	6	1															
29	7	1															
29	8	1															
29	9		5	5.360.87	0.999815469	-324.6123226	-251.8831328	5.449.40	287.8412224	0.643880027	-177.25265	584.8758034	499.5892596	-501.86	332.99	5.948.99	
29	10			4150.086789	0.999654526	618.9388864	99.6386102	4207.341843	224.5937068	0.5908019167	-541.55905	52.40506033	419.2228187	77.38	152.04	4.626.56	
29	11																
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30	0		15	3.520.50	0.999581917	-142.7105807	-499.0598279	3.592.68	326.1808589	0.6703541701	383.6666065	388.615451	647.9455777	240.96	-110.44	4.240.62	
30	1		4	3.845.49	0.999646717	-270.0890595	-466.4087215	3.911.73	647.6954319	0.8062767058	379.1535547	204.3888826	1203.795544	103.06	-262.02	5.115.49	
30	2		15	5.039.30	0.999552204	-270.5167681	-205.1340989	5.181.82	183.9050701	0.5486119242	24.7541697	237.1238018	567.4414026	245.78	-33.01	6.749.26	
30	3		1	4.679.13	0.9997591236	-184.7611755	305.9877771	4.768.21	220.1400999	0.5865413451	-438.9561229	407.7319435	320.1822388	254.19	-80.74	5.088.40	
30	4		4	4.407.35	0.9997188153	533.1323151	47.63131861	4.378.51	125.0614475	0.4705801127	-380.7636423	-149.7465129	287.8372061	152.37	-102.12	4.666.35	
30	5		10	5917.896262	0.9998482055	-364.0502741	-540.830085	5986.569707	273.9920294	0.633288823	366.8286473	626.3973485	249.2909267	2.78	85.57	6.235.88	
30	6		7	3.470.35	0.999568739	60.4283205	684.5934835	3.910.88	332.4842292	0.6744775421	-108.8433548	-672.980788	517.2059496	-69.42	-8.29	6.028.25	
30	7		4	4.717.66	0.999762973	10.34146888	-681.7310817	4.773.07	160.5260433	0.5204839925	73.70196883	425.9317635	374.2435984	84.09	-255.80	5.147.31	
30	8		8	5126.642142	0.9997085736	1.69384722	147.0710874	5228.520032	199.2420307	0.5654210268	100.2641251	-368.630703	494.4813697	101.96	-251.56	5.723.00	
30	9		4	5.964.74	0.9995818308	486.1930795	319.0969283	6.071.05	244.1045164	0.6085701776	-640.6395256	-229.1146222	233.7058396	-154.44	89.98	6.304.75	
30	10	1															
30	11	1															
30	12	1															
30	13	1															
30	14		1	2.108.12	0.9988718465	-437.3336168	-237.528216	2.151.83	199.3670007	0.5655532109	544.9181374	226.5997316	255.883749	107.58	-10.93	2.407.71	
30	15	1															
30	16	1															
30	17		1	5.897.69	0.9998469987	451.5038907	-564.3500284	5.958.08	178.08	0.541904	-438.3185765	227.8581832	348.93	13.10	-336.49	6.306.99	
30	18	1															
30	19	1															
30	20		7	4.013.31	0.9996749272	391.4201091	363.1178388	4.082.21	137.3199773	0.4889737541	-307.3097358	-328.7004996	272.0032883	84.11	34.42	4.354.21	
30	21		9	2.882.99	0.9990328289	-220.5950761	-172.1877743	2.389.21	2282.993066	0.9990328289	-220.5950761	-172.1877743	2360.214918	441.19	-344.38	4.738.43	
30	22		6	5.716.72	0.99983734	279.1280482	-426.692989	5.798.40	287.8134774	0.6437853389	-480.3503055	97.1910335	668.2617093	-129.23	-329.50	6.466.66	
30	23		8	3219.155404	0.9995010071	477.5516645	-312.0446391	3273.156822	170.0359416	0.5320344511	-391.8362112	236.917421	371.6931393	85.62	-75.13	3.644.85	
30	24		9	2.162.74	0.999461827	474.812506	-288.1622775	2.216.81	138.5873	0.4808011239	-394.0148707	297.2042909	229.2389006	80.80	-39.96	2.446.05	
30	25		3	4.109.38	0.999699516	-284.3760057	-693.006983	4.174.88	295.104179	0.6491248589	194.5316913	-554.8434745	540.146491	-89.79	-61.34	4.718.03	
30	26		12	3.695.74	0.999597413	-628.1888279	381.6554633	3.641.89	115.1223024	0.4546216666	341.9892565	-143.8918726	302.7003045	-184.20	237.99	3.944.39	
30	27		14	3645.860006	0.9996081029	-197.8577174	-426.0747788	3719.843867	471.3534183	0.7463502082	-123.1134751	34.2928202	1044.079706	320.97	-391.82	4.763.92	
30	28		4	2728.216639	0.9993130293	-316.9748303	-482.743179	2771.746291	700.7886765	0.6199926738	-15.91882789	-95.81808194	1340.284322	-332.49	386.93	4.112.03	
30	29		4	6.945.45	0.9998480881	-175.364448	-660.608943	7.025.13	237.073823	0.602270793	82.62467143	127.233188	691.3512824	257.77	-433.63	3.716.48	
30	30		2	5.385.92	0.9998171487	441.5603735	-438.9074416	5.454.50	362.4439321	0.689672952	437.030661	614.1253524	466.0991876	-4.52	175.22	5.920.60	
30	31		4	5403.7861	0.9998183239	-349.9483372	480.4224467	5475.698261	508.2540411	0.7611532366	473.5811887	-501.0893767	858.1591137	123.68	-21.07	6.333.82	
30	32		13	6962.795209	0.9998020338	113.6195004	-715.0595192	7049.935978	195.0100175	0.560901018	-175.0978962	530.8853715	302.2749891	-61.45	-184.16	7.352.21	
30	33																













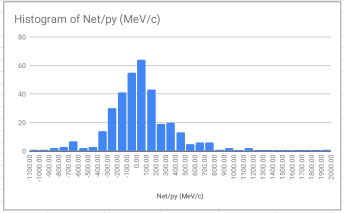
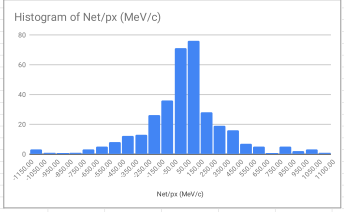
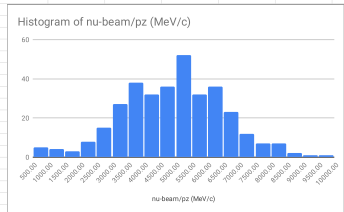






Numbers initially seen in Rows 6-9. Columns C-N are placeholders only. Please overwrite them as you enter actual data.										Cells below (Columns O, P, and Q) contain formulas. Do not overwrite!									
merged Tuple	Entry	Background (enter a 1)	Signal Event Slice No.	Muon KE (MeV)	v/c	px (MeV/c)	py (MeV/c)	pz (MeV/c)	Proton KE (MeV)	v/c	px (MeV/c)	py (MeV/c)	pz (MeV/c)	Net px (MeV/c)	Net py (MeV/c)	Net pz (MeV/c)	nu-beam pz (MeV/c)		
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Add a series to start visualizing your data



No. big events = 184

delta-px (MeV/c) (FWHM/2) = 100      delta-py (MeV/c) (FWHM/2) =







Numbers initially seen in Rows 6-9. Columns C-N are placeholders only. Please overwrite them as you enter actual data.													Cells below (Columns O, P, and Q) contain formulas. Do not overwrite!				
merged Tuple	Entry	Background (enter a 1)	Signal Event Slice No.	Muon KE (MeV)	v/c	px (MeV/c)	py (MeV/c)	pz (MeV/c)	Proton KE (MeV)	v/c	px (MeV/c)	py (MeV/c)	pz (MeV/c)	Net px (MeV/c)	Net py (MeV/c)	net-beam pz (MeV/c)	
60	46																
60	47																
60	48																
60	49																
60	50																
62	0		23	4105.31677	0.999888005	-437.4991956	-209.3989346	4180.962325	286.1283989	0.642512423	11.50929478	34.9745428	785.6784976	-425.99	-174.42	4.96664	
62	1																
62	2		10	2332.265787	0.99907158	426.2294905	-178.775424	2360.734342	162.3529003	0.5228026544	-330.7563195	-160.268193	442.5460435	95.47	-339.04	2.83328	
62	3		7	1935.312461	0.99867617	435.9328091	88.6402718	1986.710989	474.931791	0.547750341	138.364676	-124.872253	1028.920747	384.23	-34.74	3.00652	
62	4		10	3854.067967	0.999648249	-64.58380032	657.4134399	3902.156877	360.2121021	0.691373065	174.9667328	-355.511345	805.3005576	110.38	301.90	4.70746	
62	5		15	6678.620288	0.999882015	-318.3966733	140.632068	6773.870783	171.279623	0.5338268279	293.4288499	-131.6413696	497.2195522	-24.97	8.99	7.27109	
62	6		6	3502.85831	0.999656796	350.1374435	497.5439532	3960.82696	261.7357515	0.6234805643	277.903134	-404.839862	341.2626255	72.23	-107.80	4.30135	
62	7		4	5306.220537	0.999810866	622.3825416	115.787533	5422.380358	138.842292	0.4824146221	-462.1899828	-60.6793862	254.2190999	162.19	65.12	5.67659	
62	8		12	5301.127092	0.999811373	784.145972	49.14256379	5350.583526	273.3851526	0.6327939789	-660.1200044	-106.402236	374.8589819	104.03	-87.31	5.72545	
62	9		1														
62	10		7	3448.38514	0.999633245	648.349997	30.44440088	3492.543265	178.323963	0.541868764	-542.486044	59.59114067	200.434484	105.75	90.04	3.75249	
62	11		6	4820.38037	0.999772443	-269.4236869	406.1481992	4900.087797	129.9286992	0.478043228	88.63591832	-134.0194685	484.5707554	-180.79	272.13	5.38466	
62	12		7	2218.858044	0.999878719	383.5430626	-383.8187751	2257.178163	190.4833086	0.5958453071	-395.4084605	272.6834878	403.5842027	-11.87	-111.14	2.66076	
62	13		5	1351.890461	0.9997399537	227.7871713	41.95194845	1434.542271	245.735189	0.6099627977	-315.0480532	-260.2970701	595.2941777	-87.28	-218.35	2.02984	
62	14		14	4034.371284	0.999878828	242.8782194	520.8178028	4098.295228	1197.135943	0.893324639	112.4754057	241.3899347	1699.484709	355.15	762.21	5.99778	
62	15		1														
62	16		1														
62	17		14	3456.206695	0.999549964	495.6924939	174.9613451	3519.618882	414.7558485	0.7205533849	-768.5310706	4.869986689	599.5331159	-272.84	170.09	4.11915	
62	18		1	3354.888517	0.999526307	438.8482035	583.9042979	3380.869685	204.074056	0.5174767	-79.0286469	-212.319468	616.8899724	360.81	-370.83	3.99047	
62	19		4	5317.210884	0.9998124848	540.7834176	291.2700226	5386.260167	318.4039701	0.6653010781	-647.3300074	-209.6146956	485.521014	-106.55	82.16	5.87178	
62	20		1														
62	21		1														
62	22		16	6407.972772	0.999870002	531.8320001	-193.471673	6487.308235	220.6256495	0.5870097426	-130.5230166	73.60434482	663.4120426	401.31	-119.87	7.15072	
62	23		1														
62	24		1														
62	25		1														
62	26		1														
62	27		1														
62	28		1														
62	29		1														
62	30		2	5894.580258	0.9996468418	-162.8722757	425.0557907	5981.371379	287.241701	0.6437190641	324.3859171	-634.881338	338.0069776	161.72	-209.83	6.31938	
62	31		4	5683.33634	0.999836025	460.4980964	386.4481924	5766.131193	291.320101	0.6463722637	-76.65456605	-410.110601	676.255816	383.84	-23.66	6.44239	
62	32		8	6059.04931	0.999849065	358.3183996	424.7057883	6120.933714	261.3215024	0.623148353	-384.5749849	568.7830723	313.7102085	-26.26	-6.94	6.43464	
62	33		5	4779.78849	0.999878963	458.2495	-480.8900855	4861.451424	199.184813	0.565399748	-248.8898688	-120.863398	554.1044749	209.56	-39.86	5.41586	
62	34		1														
62	35		14	4130.39501	0.999620476	590.8028723	249.4341069	4185.200983	156.497425	0.512526236	-343.7890483	-289.3460538	304.8398159	247.01	-29.91	4.52604	
62	36		3	4185.693656	0.999705263	-410.5947921	477.7917665	4242.84543	195.4894143	0.561395417	407.6420278	-337.5813975	353.2302085	-2.95	140.21	4.59613	
62	37		8	3124.71165	0.999471399	351.7518789	229.3268137	3203.609622	289.1554849	0.644778279	487.205237	-47.803323	622.8641426	135.45	201.72	3.82346	
62	38		5	5130.1515	0.9997988436	-281.911085	447.2944356	5186.262842	113.324888	0.4516215043	97.8903877	369.8979111	281.5264363	-184.02	-277.71	4.64779	
62	39		1														
62	40		2	2248.330217	0.999049842	-565.503195	-81.51500312	2281.824472	344.2748999	0.6818266533	54.2562094	-28.5994578	872.1349436	-511.29	-110.07	3.15366	
62	41		14	5070.782426	0.999781866	-316.9719164	573.308462	5133.02711	137.469323	0.489188261	-247.528041	-41.7188854	462.304551	49.44	-61.03	5.95637	
62	42		2	4625.251888	0.999754023	318.1531805	365.882098	4708.209825	213.4990715	0.5800367286	-426.8341882	-372.9671919	360.3851755	-102.68	-7.41	5.06860	
62	43		17	157.564435	0.516682511	-368.8728536	-244.1271683	353.1718081	57.5544635	0.5166652191	-368.8728536	-244.1271683	353.1718081	-737.75	-488.25	706.34	
62	44		11	5503.793744	0.999824742	-145.889091	300.7588904	5596.144421	722.5346987	0.8251742257	331.5019289	826.8388447	1084.703223	-14.48	496.08	6.88085	
62	45		6	4659.821448	0.999744568	70.9795084	-489.952947	4617.164873	279.3493943	0.6374679325	120.801232	-13.11984939	650.912732	-493.16	476.87	5.26808	
62	46		1														
62	47		1														
62	48		6	4200.297309	0.999702548	-466.0523963	-870.1251946	4240.556669	1042.530368	0.8807344002	48.8893989	81.9019059	1741.71975	-417.46	-488.22	5.86228	
62	49		13	2934.448014	0.999361821	-471.1667687	-466.989446	2866.84562	483.678247	0.714544802	189.896687	288.389669	1008.087623	-281.27	-197.63	3.96488	
62	50		1														
63	0		6	4203.118388	0.9997029443	-164.5989895	598.9198791	4261.814308	333.220307	0.6749388412	110.933297	-653.3947026	544.9093758	-53.67	-54.47	4.80672	
63	1		16	5615.116458	0.9998319094	-624.4181063	-254.1022241	5679.28079	238.2242942	0.6033628308	500.521113	347.0305126	283.1162834	-73.89	92.93	5.96240	
63	2		1														
63	3		4	5513.869325	0.999825821	482.8163141	-143.4036961	5595.265093	174.9274404	0.5381920374	-426.9607157	137.5965476	396.0070734	55.86	-5.81	5.99217	
63	4		9	3420.410317	0.9995936302	-428.8958509	459.6497222	3497.30424	129.5518499	0.4774740563	434.1481438	28.50241546	266.5672301	5.28	74.41	3.76292	
63	5		2	3301.945851	0.9995249707	576.0007079	183.6150033	3351.24491	464.5940124	0.742475566	193.1671659	-417.3176455	935.9175551	382.84	-233.89	4.28716	
63	6		12	2608.57025	0.9992510909	285.1600737	513.9740374	2647.064964	262.7209711	0.642841488	331.4745612	-559.2735001	373.1279781	-46.31	86.73	3.00519	
63	7		9	244.633756	0.938483259	-65.49180937	-36.5258035	324.9864071	214.8542463	0.5813791421	199.1878613	123.2888055	627.8819591	133.70	-87.30	952.97	
63	8		1	3456.731399	0.999653695	444.8010388	62.16013416	3531.334043	284.289436	0.6411538991	-466.0974735	234.2059126	581.1639718	-21.30	325.37	4.11250	
63	9		1														
63	10		3	2533.08555	0.999276028	378.243675	-317.106678	2589.371637	171.7590423	0.5343952743	-407.8418976	219.890879	370.2759516	-29.60	-97.42	2.95965	
63	11		13	736.7631351	0.992458242	-102.6337863	-49.70763352	830.4189665	302.1487913	0.6541546126	116.7474184	208.6397895	775.2190332	14.11	158.93	1.60564	
63	12		25	2973.31457	0.999321263	196.1721438	-480.6971809	2625.409275	383.0671873	0.640233344	429.1489456	-90.62978197	647.1313962	625.32	-571.32	3.27254	
63	13		1														
63	14		1	5818.872356	0.999429018	-339.180668	137.1386066	5910.451072	121.6505527	0.4852154551	205.7023487	238.5119314	378.2302066	-153.48	376.65	6.28968	
63	15		3	5614.883435	0.9998314958	538.575											





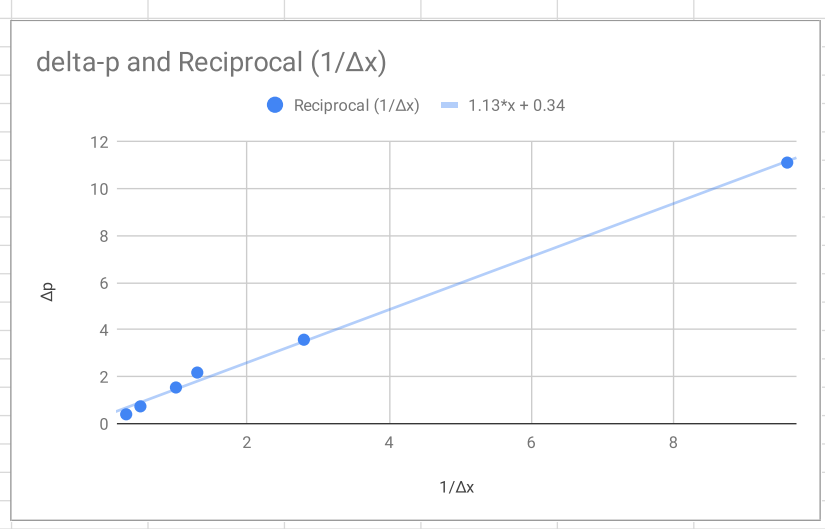
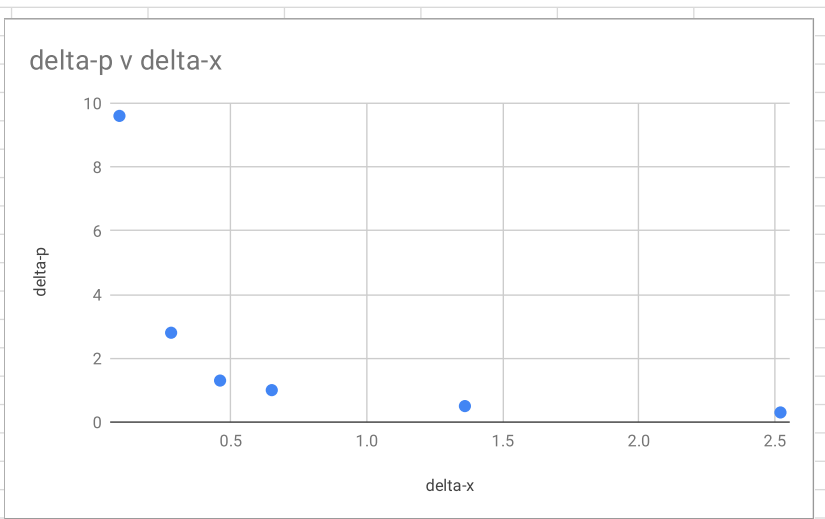




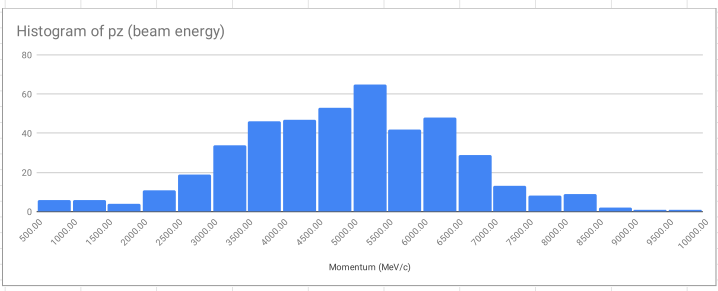




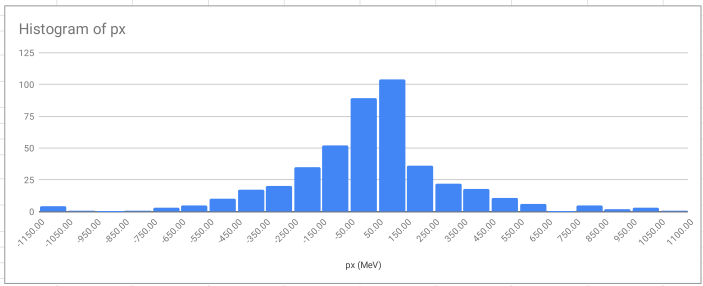
delta-p	delta-x	Reciprocal (1/Δx)
9.6	0.09	11.11111111
2.8	0.28	3.571428571
1.3	0.46	2.173913043
1	0.65	1.538461538
0.5	1.36	0.7352941176
0.3	2.52	0.3968253968



px (MeV)	py (MeV)	pz (MeV)
-239.61	354.50	5,773.40
103.21	-37.98	4,161.30
-100.00	-67.10	5,337.03
-98.98	61.69	4,280.53
-1,077.67	1,636.95	8,133.95
40.05	305.92	5,190.16
-525.81	61.04	4,986.40
524.19	462.19	4,830.45
-98.31	442.81	5,229.32



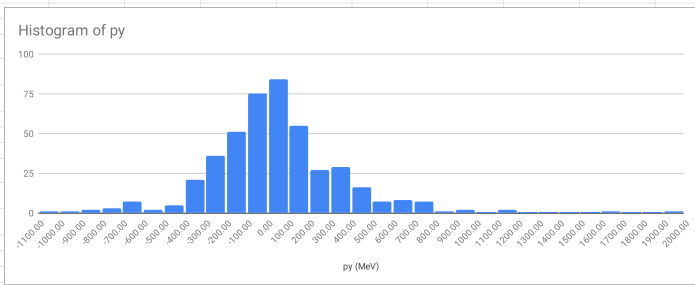
20.17	42.68	2,895.64
106.65	264.46	6,545.20
-36.84	-204.91	4,085.84
96.46	-134.13	3,093.09



Calculated:  
 Std Dev = #REF! MeV/c  
 $\Delta x = \#REF!$  fm (Heisenberg)  
 $\Delta x = \#REF!$  fm (Fermi Gas)

145.23	-129.88	5,718.45
6.66	-89.88	5,380.04

Visual:  
 Std Dev = MeV/c  
 $\Delta x = \#DIV/0!$  fm (Heisenberg)  
 $\Delta x = \#DIV/0!$  fm (Fermi Gas)



Calculated:  
 Std Dev = #REF! MeV/c  
 $\Delta y = \#REF!$  fm (Heisenberg)  
 $\Delta y = \#REF!$  fm (Fermi Gas)

23.25	-199.67	6,460.65
-46.26	-76.73	4,305.97
178.14	89.86	2,533.20

Visual:  
 Std Dev = 150.00 MeV/c  
 $\Delta y = 0.67$  fm (Heisenberg)  
 $\Delta y = 2.00$  fm (Fermi Gas)

458.17	160.30	5,093.75
-328.45	-294.21	974.72
485.44	637.77	6,845.62
7.29	-27.89	6,885.66
69.59	172.57	5,555.05
245.15	380.43	1,778.22
-163.79	265.11	3,489.84
#REF!	#REF!	#REF!

58.62	160.70	2,771.08
432.54	91.54	3,009.50
-50.67	-75.46	4,237.69
286.82	270.28	4,582.96
-207.14	791.97	2,234.99

474.21	-172.65	5,368.92
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px (MeV)	py (MeV)	pz (MeV)
516.55	86.53	6,012.84
99.65	108.43	6,104.82
516.56	274.46	6,430.14
255.37	4.96	3,684.11
-64.70	-187.05	5,426.09
-65.08	74.53	4,379.35
-775.41	408.76	3,575.87
328.18	233.79	2,516.43
53.51	52.62	5,017.57
-176.27	-43.53	5,251.65
-43.56	177.06	4,531.18
20.58	-162.42	3,790.58
-43.65	-189.14	4,523.00
75.31	-123.38	3,675.27
-3.84	118.02	3,760.10
-144.58	-324.98	2,589.10
21.20	-113.54	3,943.02
503.01	-631.45	8,507.81
-413.31	125.38	4,788.95
100.27	109.16	2,886.46
87.19	-7.28	4,732.19
105.83	-75.93	5,082.33
-32.57	287.50	3,644.37
-78.08	0.93	3,229.21
-173.01	-116.87	6,321.11
-69.18	-217.21	1,441.19
-56.72	-126.49	5,030.81
-71.72	57.53	6,825.08
126.72	-31.80	4,498.94

















[1] Physics in and through Cosmology  
Group3