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Abstract

Measurements of the cross section for the reaction $p + p \rightarrow \pi^{o}$ + (anything) have been completed. The data cover a range of incident proton energies 50 - 400 GeV, π^{o} transverse momenta ($p_{\perp}$) 0.3 - 4 GeV/c, and laboratory angles from 30 to 275 mrad. The experiment was performed using the internal proton beam at the Fermi National Accelerator Laboratory. A lead-glass counter was used to detect photons from the decay of π^{o}'s produced by collisions in thin targets of hydrogen or carbon. Tables of the measured cross sections are presented.

Introduction

A great deal of effort in recent years has gone into the study of "inclusive reactions", in which only one (or perhaps two) of the reaction products is considered, the rest being ignored. In this limited view of high energy interactions it is hoped that certain simple features of the dynamics will become apparent. Inclusive production with large transverse momentum has been of special interest, since in such measurements the short distance behavior of the hadronic structure may be more clearly exposed.

We have made measurements of the inclusive process $p + p \to \pi^0 + X$ over a wide range of kinematic variables, to look for structure or interesting dependences on energy or transverse momentum. The data were taken over continuous ranges of incident proton energies from 50 GeV to a maximum of 400 GeV, π^0 transverse momenta from about 0.3 GeV/c to 4.0 GeV/c, and center-of-mass production angles from 20° to 150°. Some preliminary results have already been reported.[1] A detailed interpretation of the data presented here appears in a separate article.[2]

Apparatus

Figure 1 shows a schematic of the layout of the apparatus in the experimental area. The experiment was carried out in the Internal Target Area of the Fermi National Accelerator Laboratory. This area is located at the C0 straight section of the accelerator, and allows experiments to be done using the internal proton beam during the acceleration cycle. Several advantages influenced the choice of this area. Of practical concern was the early availability of a usable proton beam in that location. More important, from a physics standpoint, was the possibility of making measurements with beam energies covering a continuous range from (injection) 8 GeV to (extraction) 300 or 400 GeV. The multiple traversals of the beam through the target provided a good duty cycle and allowed high interaction rates to be obtained with very thin targets (typically 10^9 interactions/sec).

Figure 2 shows schematically the two kinds of targets used in the experiment. Both were of necessity very thin so as not to interfere with the operation of the accelerator. One was a cold jet of hydrogen gas[3] squirted down through the beam for about 250 msec at a chosen time in each acceleration cycle. The target was cryo-pumped to prevent deterioration of the machine vacuum. The jet pulse was kept short to minimize background from increased amounts of gas in the system upstream and downstream of the target location. A better duty cycle was obtained with the other kind of target which consisted of fine ($\sim$ 7 micron) filaments of CH_2 or carbon, attached to a rapidly rotating wheel. The centrifugal effect of the rotation kept the filaments rigid, and each filament spent a small fraction of its time in the beam, thus reducing the chance of burning. The bulk of the data in this experiment were taken with carbon targets, the hydrogen jet being used primarily for calibration purposes, as discussed below.

The detection apparatus (Fig. 3) was located in the accelerator tunnel. Data were taken at laboratory angles ranging from 30 mrad to 275 mrad. The target region was viewed by the detectors through a thin ($\sim$ .020") stainless steel window in the accelerator vacuum system.

The view of the target region was limited by a remotely movable, two-foot-thick steel slit. At each angle setting of the apparatus, a scan over the target was made with this slit, to determine the optimum setting and to check that backgrounds were small with the slit out of position. The slit was followed by a system of permanent magnets to deflect low momentum charged particles away from the detectors and thus reduce singles rates and backgrounds. The magnets were appropriately shielded to prevent effects on the nearby accelerating beam, and were mounted on a movable carriage to permit angle changes. The detectors themselves were enclosed in a lead shielding house on another movable carriage. Photons entered the shielding house through an 8" thick lead collimator facing the target. The angle subtended at the target by this collimator was smaller than the minimum opening angle of the two photons from π^0 decay for π^0 momenta in the region studied. Hence only one photon from a given π^0 decay was observed.

The detection system itself was very simple. A 5" x 5" scintillation counter (#1) was placed immediately behind the lead collimator and was used to veto incident charged particles. A 2" x 2" x 1/4" (1.1 radiation length) piece of lead (remotely removable) was placed behind the veto counter to convert photons by pair production. This converter was immediately followed by a telescope consisting of two small (3" x 3") scintillation counters (#2, #3) to detect the pairs produced. The energy of the photon so identified was measured by detecting the Cerenkov light produced by the resulting electromagnetic shower in a block of lead-glass. This total absorption shower counter (#4) consisted of a single piece of lead-glass 6" x 6" x 15" deep (14 radiation lengths) to which was cemented a 5-inch-diameter RCA8854 photomultiplier tube (this type has a high-quantum-efficiency photocathode and high-resolution dynode structure). The requirement that the photon convert in the Pb radiator in front of the Pb glass reduced hadronic background and diminished shower fluctuations in the Pb glass. The lead-glass counter was followed by a telescope of two 5" x 5" scintillation counters (#5, #6) separated by lead absorber, to detect muons and charged hadrons penetrating the entire system.

Two methods were used to monitor the beam-target interactions during the experiment. One was a small scintillator telescope, shown in Fig. 1 set at a typical angle of 75° from the incident beam direction. A large lab angle was found to be essential for monitor telescopes, because of the large background encountered in the forward direction. To improve the rejection of non-target-associated background, the telescope included both thin and thick scintillators so as to be capable of identifying slow protons, deuterons, tritons, and alphas recoiling at large angles from the target, by simultaneously measuring dE/dx and E for each particle. As shown in Fig. 4, the different masses are cleanly separated. The proton rate was recorded for each run, and provided a stable relative luminosity monitor. The absolute normalization of the data taken at each angle was performed by using a solid-state detector, mounted near 90° as shown in Fig. 1, to detect recoil protons elastically scattered from the hydrogen jet. The position and solid angle of the detector were known, allowing absolute normalization of the photon cross section by reference to previously measured proton-proton elastic cross sections.[4] As shown in Fig. 5, the elastic peak in the detector was quite clean. The photon data obtained with a carbon target (which extended to larger $P_{\perp}$ than that with the hydrogen target) were then normalized to these absolute cross sections at each incident energy and angle.

Data Collection

The electronic logic system is displayed schematically in Fig. 6. Photomultiplier pulses from the detectors were brought to fast discriminator modules, and the resulting shaped pulses were used to make coincidences between various counters. Photons were identified by a $\gamma \equiv \bar{1} \cdot 2 \cdot 3 \cdot 4$ trigger, requiring no pulse in the veto counter #1 but a coincidence of the counters following the lead converter. Muons or other fast charged particles traversing the system were selected by a coincidence of all detectors except the lead-glass counter, "μ" $\equiv 1 \cdot 2 \cdot 3 \cdot 5 \cdot 6$.

Due to the very rapid decrease of the photon rate with increasing photon energy, three separate discriminators with different threshold settings were used to process the pulses from the lead-glass counter. The pulses from the discriminator with the lowest setting, hence highest rate, were sent to a scaler-gating system which allowed only every 256th pulse to make a γ trigger. For the middle setting, every 16th pulse was passed through, while all pulses from the highest discriminator were accepted. The effect was to minimize computer-dead-time losses, which would have been very large with a single ungated low level discriminator, and yet allow ample triggers at the low pulse heights. Since the above ratios were precisely determined and constantly monitored, no normalization difficulties were introduced.

Data from the fast electronics were recorded by a PDP-11 computer through a CAMAC system of scalers, analog-to-digital converters (ADC's), and latches. The information recorded on scalers included counter single rates, various coincidences, monitor counts, and the value of the proton beam momentum as a function of time. The beam momentum was derived from a train of pulses sent from the main accelerator control room, in which each pulse signified a fixed increment in the main ring magnetic field. The ADC's were used to record pulse heights in all counters. At each event, an interrupt signalled the computer to record on magnetic tape all pulse heights and some of the scalers. At the end of a run, all scaler values were written on tape.

Normal data runs were taken with the γ trigger providing the event interrupt and the lead converter in place. The target was the rotating wheel with carbon filaments, its position adjusted with respect to the beam to keep the counting rates below certain levels as monitored by accidental coincidence rates. Figure 7 shows a typical pulse height distribution in counter #2 (immediately after the lead converter) from such a photon run. There is a small peak corresponding to a single minimum-ionizing particle, followed by a large peak at twice that pulse height, then other peaks (less well defined) corresponding to higher multiples. The large peak results from electron-positron pairs produced in the lead converter by an incident photon. The small peak is consistent with the small fraction of pairs from which one member is produced at such large angle or such small energy as not to penetrate counter #2.

Although this pulse-height distribution is very strong evidence of a clean photon trigger, a number of other checks were made to verify that the events were really due only to photons originating at the target. Figure 8 shows results of a typical scan made with the two-foot-thick steel slit after every angle change. It is apparent that when the slit is out of position the γ rate almost vanishes ($\lesssim$ 1% of the peak rate). Test runs were made with the lead converter removed from the detection system, and in such runs the rate was found to be about 1.5% that with the converter in, independent of photon energy, consistent with photon conversion in the remaining material: counter plastic and wrappings. In addition, runs were made with the lead converter replaced by a piece of aluminum of the same number of radiation lengths, but a greater number of nuclear interaction lengths. This could be expected to make a relative increase in background from neutral hadrons, but no difference in rate was observed even at the highest transverse momenta. Empty target runs were made periodically, and at all angles the observed rate was small enough (< 1%) that no empty target subtraction was necessary. Finally, runs were made at various beam interaction rates to ensure that no significant rate effects were present in the data.

At every angle a series of short normalization runs was made with the hydrogen jet target. As discussed above, a solid state detector was used to detect recoil protons elastically scattered from the target, thereby allowing an absolute normalization of the simultaneously measured photon rate. The timing of the jet pulse during the acceleration cycle was varied from run to run so that a different beam momentum was used for each run, thereby covering the full range of useful momenta from under 50 GeV/c to 300 GeV/c or 400 GeV/c. At one laboratory angle, 100 mrad, a large amount of time was spent running with hydrogen as well as with carbon, and the γ spectra from the two types of targets could be compared out to 3 GeV/c transverse momentum. The dependences of the cross sections on $p_{\perp}$ were the same within statistical error, thereby establishing the insensitivity of the results to nuclear effects and justifying the use of the carbon target.

Frequent short runs were taken with the "μ" trigger as the event interrupt. As shown in Fig. 9, the lead-glass counter #4 pulse height distribution for such runs showed a single clean peak, as expected. The position of the peak could be determined to a precision of ± 2% or better, so this information served to monitor the energy calibration of the shower counter as a function of time. This energy calibration was originally determined from measurements with electrons in a momentum-analyzed charged beam of 1.8 GeV/c to 5 GeV/c at the Argonne ZGS. Later, after all measurements were completed, another calibration was done at Fermilab in a charged momentum-analyzed beam of 10 to 35 GeV/c. The results were in reasonable agreement with the earlier measurements. In addition, the linearity of the photomultiplier tube and associated ADC was measured with a light-emitting diode and neutral-density filters. The results showed that the system was linear to an accuracy of ± 1% over the range of interest.

Data Reduction and Results

The magnetic tapes of raw events were processed at the Fermilab Computation Center. Histograms of events were produced using the computer program KIOWA. The primary cut on the raw events was made on the pulse-height of counter #2, rejecting events with a pulse height falling in the region of the single-minimum-ionizing peak seen in Fig. 7. Only a small fraction (less than 2%) of the events failed this cut, but these are expected to include essentially all events due to charged particles which the veto counter failed to reject. No correction to the γ cross section was made for the loss of events due to this cut. An additional cut was made on the lead-glass counter (#4) pulse height, to reject events with pulse-height near discriminator threshold.

The data were then binned by incident proton momentum, in intervals of 5 GeV/c from 50 to 135 GeV/c, and in 25 GeV/c bins from 150 to 400 GeV/c. In each momentum bin, histograms were made of the events as a function of photon energy, which was derived from the pulse height in the lead-glass counter using the calibration determined as previously described. The absolute normalization of the data at low transverse momentum as a function of beam momentum was determined by comparing the photon rate with that of elastically scattered protons in calibration runs with the hydrogen gas jet, also described above. This calculation used the known solid angles accepted by the detection system (typically of the order of 10 μsr) and by the solid state monitor. Hence to determine the single γ cross section, the following expression was used:

$$\frac{d^2\sigma_\gamma}{dk\ d\Omega_\gamma} = \frac{N_\gamma}{\Delta k\ \Delta\Omega_\gamma} \qquad \frac{\frac{d\sigma}{d\Omega_p}(p + p \rightarrow p + p)\Delta\Omega_p}{\alpha\ N_p}\eta$$

where N_γ = the number of detected γ rays of energy $k \pm \Delta k/2$ in the solid angle $\Delta\Omega_\gamma$, N_p = the number of detected protons in the solid state monitor associated with N_γ, α = the fraction of these detected protons which come from elastic scattering, $\frac{d\sigma}{d\Omega_p}$ $(p + p \rightarrow p + p)\Delta\Omega_p$ = the integrated elastic cross section for p - p scattering in the solid state monitor, and η = (correction for computer dead time) x (γ conversion probability) x (correction for accidental veto triggers in the front veto counter (typically 10%)).

The resulting histograms of the inclusive photon cross section were converted to π^o cross sections under the assumption[5] that all the γ rays came from π^o decay. As shown by Sternheimer,[6] the invariant π^o cross section is then given by

$$E\frac{d^3\sigma}{dp^3} = -\frac{1}{2}\frac{\partial}{\partial k}\left(\frac{d^2\sigma_\gamma}{dk d\Omega_\gamma}\right)$$

The Sternheimer analysis was accomplished by first performing a minimum χ^2 fit to the photon cross section of the form:

$$\frac{d^2\sigma_\gamma}{dk d\Omega_\gamma} = A\ \exp(-Bp_\perp - Cp_\perp^{\ 2})$$

where $p_\perp = k \sin\theta_\gamma$ = gamma ray transverse momentum in the lab frame, and the parameters A, B and C were determined from the fit.

The derived fit parameters B and C were then used to obtain the derivative:

$$-\frac{1}{2}\frac{\partial}{\partial k}\left(\frac{d^2\sigma_\gamma}{dk\,d\Omega_\gamma}\right) = \frac{\sin\theta_\gamma}{2}\,(B + 2CP_\perp)\,\frac{d^2\sigma_\gamma}{dk\,d\Omega_\gamma}$$

where $\frac{d^2\sigma_\gamma}{dk\,d\Omega_\gamma}$ = the measured (not the fitted) value of the γ cross section. The resulting error in the π^o invariant cross section then has contributions from the statistical errors in the fit parameters B and C (typically $\frac{\Delta B}{B} \lesssim \pm 2\%$ and $\frac{\Delta C}{C} \lesssim \pm 10\%$ respectively), from the statistical uncertainty of the data point itself (small except for the very largest values of $p_\perp$), and from the statistical errors in the absolute normalization which were typically $\sim \pm 5\%$. The systematic error in the normalization (from energy calibrations of the Pb glass, solid angles, etc.) was not included, but is estimated to be $\sim \pm 30\%$.

The π^o invariant cross sections obtained by this method agreed well with the results from either calculating the derivative directly by a bin-bin subtraction procedure, or by using only the fitted form. The π^o invariant cross sections obtained from this analysis are presented in Table I.[7] Typically, several bins in transverse momentum have been combined to produce each entry in the table. Sample cross sections are shown in Fig. 10. Although no sharp structure or threshold effects are seen, the dependence of the shape of the spectra on beam momentum and lab angle is quite apparent. The interpretation of these effects, and comparison with other experiments, may be found in a separate article.[2]

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[6] R. M. Sternheimer, Phys. Rev. 99, 277 (1955).

[7] Because of the limitation of space, only the data in increments of 25 GeV/c incident momentum are presented. The complete data set may be obtained from the authors.

TABLE I

π^0 Invariant Cross Section in Millibarns/(GeV^2/c^3)

Laboratory Angle = 30 Milliradians

Incident Proton Momentum = 50 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.401	1.274×10^{0}	5.180×10^{-2}
0.582	3.530×10^{-1}	1.588×10^{-2}
0.779	8.028×10^{-2}	3.555×10^{-3}
1.072	8.676×10^{-3}	5.115×10^{-4}
1.328	5.672×10^{-4}	9.558×10^{-5}

Incident Proton Momentum = 75 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.399	1.829×10^{0}	9.917×10^{-2}
0.583	6.056×10^{-1}	3.399×10^{-2}
0.774	1.809×10^{-1}	9.908×10^{-3}
0.960	5.482×10^{-2}	3.104×10^{-3}
1.143	1.642×10^{-2}	1.020×10^{-3}
1.345	4.322×10^{-3}	3.156×10^{-4}
1.829	1.588×10^{-4}	1.573×10^{-5}
2.077	2.883×10^{-5}	6.000×10^{-6}

Incident Proton Momentum = 100 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.401	2.252×10^{0}	1.526×10^{-1}
0.580	8.178×10^{-1}	5.577×10^{-2}
0.772	2.652×10^{-1}	1.797×10^{-2}
0.958	8.975×10^{-2}	6.173×10^{-3}
1.149	2.799×10^{-2}	2.060×10^{-3}
1.337	1.033×10^{-2}	7.961×10^{-4}
1.520	3.588×10^{-3}	2.645×10^{-4}
1.704	1.220×10^{-3}	9.553×10^{-5}
1.887	3.927×10^{-4}	3.622×10^{-5}
2.640	6.641×10^{-6}	1.804×10^{-6}

Incident Proton Momentum = 125 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.397	2.710×10^{0}	2.117×10^{-1}
0.586	8.797×10^{-1}	7.102×10^{-2}
0.772	3.172×10^{-1}	2.483×10^{-2}
0.957	1.119×10^{-1}	8.830×10^{-3}
1.143	4.168×10^{-2}	3.397×10^{-3}
1.335	1.453×10^{-2}	1.246×10^{-3}
1.516	5.768×10^{-3}	4.669×10^{-4}
1.703	2.126×10^{-3}	1.789×10^{-4}
1.892	7.471×10^{-4}	6.934×10^{-5}
2.074	3.376×10^{-4}	3.541×10^{-5}
2.262	7.807×10^{-5}	1.291×10^{-5}
2.707	6.452×10^{-6}	2.304×10^{-6}

Incident Proton Momentum = 150 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.399	2.924×10^{0}	2.449×10^{-1}
0.583	1.023×10^{0}	8.538×10^{-2}
0.771	3.582×10^{-1}	2.986×10^{-2}
0.956	1.346×10^{-1}	1.118×10^{-2}
1.144	5.017×10^{-2}	4.204×10^{-3}
1.332	1.966×10^{-2}	1.662×10^{-3}
1.517	7.847×10^{-3}	6.543×10^{-4}
1.704	3.133×10^{-3}	2.628×10^{-4}
1.890	1.263×10^{-3}	1.072×10^{-4}
2.078	4.987×10^{-4}	4.392×10^{-5}
2.267	1.896×10^{-4}	1.813×10^{-5}
2.451	6.516×10^{-5}	7.383×10^{-6}
2.629	3.141×10^{-5}	4.260×10^{-6}
2.756	1.858×10^{-5}	4.218×10^{-6}

Laboratory Angle = 30 Milliradians

Incident Proton Momentum = 175 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.398	3.166×10^{0}	2.896×10^{-1}
0.583	1.102×10^{0}	1.008×10^{-1}
0.772	3.798×10^{-1}	3.466×10^{-2}
0.956	1.445×10^{-1}	1.315×10^{-2}
1.142	5.593×10^{-2}	5.103×10^{-3}
1.329	2.229×10^{-2}	2.047×10^{-3}
1.517	9.191×10^{-3}	8.361×10^{-4}
1.704	3.877×10^{-3}	3.538×10^{-4}
1.890	1.601×10^{-3}	1.475×10^{-4}
2.076	6.931×10^{-4}	6.531×10^{-5}
2.262	2.975×10^{-4}	2.940×10^{-5}
2.458	1.080×10^{-4}	1.239×10^{-5}
2.644	3.749×10^{-5}	5.508×10^{-6}
2.751	2.630×10^{-5}	5.840×10^{-6}

Incident Proton Momentum = 225 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.399	3.631×10^{0}	3.924×10^{-1}
0.586	1.253×10^{0}	1.363×10^{-1}
0.770	4.803×10^{-1}	5.144×10^{-2}
0.956	1.816×10^{-1}	1.947×10^{-2}
1.142	7.659×10^{-2}	8.221×10^{-3}
1.328	3.028×10^{-2}	3.266×10^{-3}
1.515	1.365×10^{-2}	1.456×10^{-3}
1.703	5.849×10^{-3}	6.270×10^{-4}
1.886	2.686×10^{-3}	2.879×10^{-4}
2.073	1.165×10^{-3}	1.271×10^{-4}
2.262	5.359×10^{-4}	6.070×10^{-5}
2.452	2.177×10^{-4}	2.689×10^{-5}
2.643	9.111×10^{-5}	1.299×10^{-5}
2.753	5.824×10^{-5}	1.253×10^{-5}

Incident Proton Momentum = 200 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.398	3.456×10^{0}	3.479×10^{-1}
0.584	1.205×10^{0}	1.217×10^{-1}
0.770	4.528×10^{-1}	4.537×10^{-2}
0.956	1.728×10^{-1}	1.729×10^{-2}
1.144	6.723×10^{-2}	6.785×10^{-3}
1.330	2.834×10^{-2}	2.868×10^{-3}
1.517	1.177×10^{-2}	1.180×10^{-3}
1.701	5.330×10^{-3}	5.327×10^{-4}
1.886	2.347×10^{-3}	2.356×10^{-4}
2.074	9.949×10^{-4}	1.020×10^{-4}
2.267	3.816×10^{-4}	4.181×10^{-5}
2.452	1.807×10^{-4}	2.124×10^{-5}
2.647	7.001×10^{-5}	9.911×10^{-6}
2.765	4.396×10^{-5}	9.588×10^{-6}

Incident Proton Momentum = 250 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.399	3.709×10^{0}	4.107×10^{-1}
0.585	1.279×10^{0}	1.422×10^{-1}
0.771	4.691×10^{-1}	5.166×10^{-2}
0.955	1.849×10^{-1}	2.027×10^{-2}
1.142	7.343×10^{-2}	8.115×10^{-3}
1.329	3.035×10^{-2}	3.383×10^{-3}
1.515	1.362×10^{-2}	1.490×10^{-3}
1.702	6.119×10^{-3}	6.715×10^{-4}
1.885	2.773×10^{-3}	3.049×10^{-4}
2.075	1.271×10^{-3}	1.428×10^{-4}
2.263	5.508×10^{-4}	6.451×10^{-5}
2.452	2.501×10^{-4}	3.140×10^{-5}
2.629	1.232×10^{-4}	1.681×10^{-5}
2.760	6.786×10^{-5}	1.470×10^{-5}

Laboratory Angle = 30 Milliradians

Incident Proton Momentum = 275 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.398	4.001×10^{0}	4.931×10^{-1}
0.583	1.379×10^{0}	1.701×10^{-1}
0.770	5.240×10^{-1}	6.406×10^{-2}
0.957	2.084×10^{-1}	2.549×10^{-2}
1.142	8.789×10^{-2}	1.079×10^{-2}
1.331	3.539×10^{-2}	4.406×10^{-3}
1.514	1.583×10^{-2}	1.925×10^{-3}
1.705	6.742×10^{-3}	8.307×10^{-4}
1.889	3.348×10^{-3}	4.128×10^{-4}
2.080	1.386×10^{-3}	1.761×10^{-4}
2.252	7.292×10^{-4}	9.288×10^{-5}
2.442	3.115×10^{-4}	4.296×10^{-5}
2.638	1.397×10^{-4}	2.192×10^{-5}
2.768	9.375×10^{-5}	2.269×10^{-5}

Incident Proton Momentum = 300 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.399	3.958×10^{0}	4.601×10^{-1}
0.585	1.362×10^{0}	1.589×10^{-1}
0.770	4.961×10^{-1}	5.715×10^{-2}
0.956	1.875×10^{-1}	2.164×10^{-2}
1.139	8.091×10^{-2}	9.269×10^{-3}
1.328	3.299×10^{-2}	3.823×10^{-3}
1.514	1.464×10^{-2}	1.673×10^{-3}
1.701	6.600×10^{-3}	7.564×10^{-4}
1.887	2.973×10^{-3}	3.432×10^{-4}
2.075	1.341×10^{-3}	1.575×10^{-4}
2.262	6.241×10^{-4}	7.518×10^{-5}
2.452	2.929×10^{-4}	3.734×10^{-5}
2.638	1.333×10^{-4}	1.857×10^{-5}
2.757	7.816×10^{-5}	1.653×10^{-5}

Laboratory Angle = 50 Milliradians

Incident Proton Momentum = 50 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.446	2.999×10^{0}	1.083×10^{-1}
0.682	6.207×10^{-1}	2.092×10^{-2}
0.908	1.336×10^{-1}	5.129×10^{-3}
1.147	2.343×10^{-2}	8.838×10^{-4}
1.364	4.624×10^{-3}	2.077×10^{-4}
1.636	1.919×10^{-4}	2.047×10^{-5}
2.176	1.578×10^{-5}	8.318×10^{-6}

Incident Proton Momentum = 75 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.449	3.343×10^{0}	1.531×10^{-1}
0.679	8.034×10^{-1}	3.456×10^{-2}
0.905	1.923×10^{-1}	8.791×10^{-3}
1.138	4.633×10^{-2}	2.070×10^{-3}
1.365	1.203×10^{-2}	5.510×10^{-4}
1.591	3.246×10^{-3}	1.760×10^{-4}
1.812	8.918×10^{-4}	6.799×10^{-5}
2.029	2.099×10^{-4}	2.875×10^{-5}
2.252	4.480×10^{-5}	1.258×10^{-5}

Incident Proton Momentum = 100 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.449	3.771×10^{0}	1.795×10^{-1}
0.678	9.391×10^{-1}	4.213×10^{-2}
0.903	2.521×10^{-1}	1.176×10^{-2}
1.139	6.528×10^{-2}	3.018×10^{-3}
1.358	2.008×10^{-2}	9.115×10^{-4}
1.588	5.868×10^{-3}	2.962×10^{-4}
1.806	1.890×10^{-3}	1.155×10^{-4}
2.039	5.582×10^{-4}	5.029×10^{-5}
2.259	1.671×10^{-4}	2.467×10^{-5}
2.605	2.604×10^{-5}	8.271×10^{-6}
2.830	7.174×10^{-6}	8.056×10^{-6}

Incident Proton Momentum = 125 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.451	3.841×10^{0}	1.755×10^{-1}
0.676	1.021×10^{0}	4.249×10^{-2}
0.907	2.702×10^{-1}	1.203×10^{-2}
1.134	8.073×10^{-2}	3.429×10^{-3}
1.361	2.403×10^{-2}	1.026×10^{-3}
1.586	8.033×10^{-3}	3.729×10^{-4}
1.809	2.598×10^{-3}	1.467×10^{-4}
2.033	9.895×10^{-4}	7.378×10^{-5}
2.269	2.963×10^{-4}	3.533×10^{-5}
2.489	9.073×10^{-5}	1.827×10^{-6}
2.720	3.423×10^{-5}	1.075×10^{-5}
2.962	1.215×10^{-5}	7.588×10^{-6}

Incident Proton Momentum = 150 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.450	4.146×10^{0}	1.635×10^{-1}
0.676	1.112×10^{0}	4.238×10^{-2}
0.903	3.234×10^{-1}	1.244×10^{-2}
1.133	9.229×10^{-2}	3.529×10^{-3}
1.359	3.018×10^{-2}	1.143×10^{-3}
1.587	1.022×10^{-2}	3.957×10^{-4}
1.814	3.480×10^{-3}	1.425×10^{-4}
2.038	1.318×10^{-3}	6.026×10^{-5}
2.271	4.452×10^{-4}	2.616×10^{-5}
2.500	1.630×10^{-4}	1.329×10^{-5}
2.710	5.836×10^{-5}	7.132×10^{-6}
2.960	2.086×10^{-5}	4.017×10^{-6}
3.257	3.808×10^{-6}	1.399×10^{-6}
3.517	2.926×10^{-6}	1.954×10^{-6}

Incident Proton Momentum = 175 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.448	4.337×10^{0}	1.774×10^{-1}
0.676	1.169×10^{0}	4.631×10^{-2}
0.903	3.341×10^{-1}	1.341×10^{-2}
1.131	1.021×10^{-1}	4.040×10^{-3}
1.357	3.364×10^{-2}	1.320×10^{-3}
1.585	1.172×10^{-2}	4.698×10^{-4}
1.811	4.331×10^{-3}	1.833×10^{-4}
2.036	1.595×10^{-3}	7.613×10^{-5}
2.263	6.175×10^{-4}	3.638×10^{-5}
2.488	2.243×10^{-4}	1.824×10^{-5}
2.709	8.338×10^{-5}	1.008×10^{-5}
2.943	3.092×10^{-5}	5.702×10^{-6}
3.260	5.230×10^{-6}	1.909×10^{-6}
3.672	1.855×10^{-6}	1.158×10^{-6}

Laboratory Angle = 50 Milliradians

Incident Proton Momentum = 200 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.449	4.387×10^{0}	2.178×10^{-1}
0.677	1.173×10^{0}	5.650×10^{-2}
0.902	3.489×10^{-1}	1.687×10^{-2}
1.132	1.076×10^{-1}	5.162×10^{-3}
1.357	3.620×10^{-2}	1.717×10^{-3}
1.585	1.268×10^{-2}	6.125×10^{-4}
1.809	4.947×10^{-3}	2.467×10^{-4}
2.038	1.626×10^{-3}	1.004×10^{-4}
2.268	6.991×10^{-4}	4.590×10^{-5}
2.489	2.603×10^{-4}	2.233×10^{-5}
2.706	9.917×10^{-5}	1.213×10^{-5}
2.938	3.542×10^{-5}	6.629×10^{-6}
3.184	1.418×10^{-5}	3.972×10^{-6}
3.625	2.231×10^{-6}	1.180×10^{-6}

Incident Proton Momentum = 250 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.449	4.479×10^{0}	3.255×10^{-1}
0.674	1.289×10^{0}	9.052×10^{-2}
0.899	3.888×10^{-1}	2.732×10^{-2}
1.129	1.214×10^{-1}	8.474×10^{-3}
1.355	4.227×10^{-2}	2.927×10^{-3}
1.587	1.501×10^{-2}	1.059×10^{-3}
1.814	5.834×10^{-3}	4.213×10^{-4}
2.037	2.291×10^{-3}	1.736×10^{-4}
2.253	1.005×10^{-3}	8.266×10^{-5}
2.496	3.774×10^{-4}	3.860×10^{-5}
2.720	1.391×10^{-4}	1.923×10^{-5}
2.940	6.243×10^{-5}	1.136×10^{-5}
3.246	1.868×10^{-5}	4.603×10^{-6}
3.517	3.245×10^{-6}	3.668×10^{-6}

Incident Proton Momentum = 225 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.449	4.388×10^{0}	2.613×10^{-1}
0.676	1.234×10^{0}	7.121×10^{-2}
0.904	3.623×10^{-1}	2.107×10^{-2}
1.132	1.152×10^{-1}	6.630×10^{-3}
1.357	3.957×10^{-2}	2.250×10^{-3}
1.586	1.421×10^{-2}	8.204×10^{-4}
1.813	5.302×10^{-3}	3.161×10^{-4}
2.044	2.021×10^{-3}	1.309×10^{-4}
2.269	7.981×10^{-4}	5.939×10^{-5}
2.506	3.065×10^{-4}	2.931×10^{-5}
2.719	1.420×10^{-4}	1.707×10^{-5}
2.938	5.311×10^{-5}	9.320×10^{-6}
3.168	1.668×10^{-5}	4.805×10^{-6}
3.505	5.947×10^{-6}	2.486×10^{-6}

Incident Proton Momentum = 275 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.449	4.522×10^{0}	3.777×10^{-1}
0.676	1.296×10^{0}	1.035×10^{-1}
0.902	3.844×10^{-1}	3.103×10^{-2}
1.130	1.263×10^{-1}	1.004×10^{-2}
1.357	4.384×10^{-2}	3.458×10^{-3}
1.581	1.683×10^{-2}	1.341×10^{-3}
1.809	6.029×10^{-3}	5.058×10^{-4}
2.034	2.699×10^{-3}	2.456×10^{-4}
2.265	1.176×10^{-3}	1.234×10^{-4}
2.482	4.401×10^{-4}	5.909×10^{-5}
2.821	9.853×10^{-5}	1.969×10^{-5}
3.293	1.450×10^{-5}	6.743×10^{-6}

Incident Proton Momentum = 300 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.452	4.316×10^{0}	5.091×10^{-1}
0.673	1.315×10^{0}	1.342×10^{-1}
0.896	3.700×10^{-1}	4.038×10^{-2}
1.135	1.152×10^{-1}	1.215×10^{-2}
1.360	4.251×10^{-2}	4.405×10^{-3}
1.577	1.734×10^{-2}	1.869×10^{-3}
1.816	6.361×10^{-3}	8.058×10^{-4}
2.019	2.452×10^{-3}	3.789×10^{-4}
2.288	4.733×10^{-4}	1.414×10^{-4}
2.702	1.395×10^{-4}	5.718×10^{-5}
2.983	3.016×10^{-5}	6.783×10^{-6}

Laboratory Angle = 65 Milliradians

Incident Proton Momentum = 50 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.435	2.491×10^{0}	9.125×10^{-2}
0.670	5.411×10^{-1}	1.864×10^{-2}
0.883	1.399×10^{-1}	5.192×10^{-3}
1.126	3.027×10^{-2}	1.229×10^{-3}
1.329	8.416×10^{-3}	3.127×10^{-4}
1.547	1.903×10^{-3}	1.068×10^{-4}
1.771	5.427×10^{-4}	5.060×10^{-5}
2.206	4.562×10^{-5}	9.923×10^{-6}
2.466	4.912×10^{-6}	1.099×10^{-5}

Incident Proton Momentum = 75 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.430	3.189×10^{0}	1.198×10^{-1}
0.669	7.629×10^{-1}	2.706×10^{-2}
0.881	2.182×10^{-1}	8.041×10^{-3}
1.124	5.372×10^{-2}	2.126×10^{-3}
1.325	1.731×10^{-2}	6.071×10^{-4}
1.549	5.260×10^{-3}	2.322×10^{-4}
1.768	1.624×10^{-3}	1.040×10^{-4}
1.995	5.386×10^{-4}	5.452×10^{-5}
2.210	1.716×10^{-4}	2.921×10^{-5}
2.420	4.826×10^{-5}	1.509×10^{-5}
2.578	3.506×10^{-5}	1.795×10^{-5}

Incident Proton Momentum = 100 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.435	3.398×10^{0}	1.429×10^{-1}
0.667	8.773×10^{-1}	3.431×10^{-2}
0.875	2.774×10^{-1}	1.082×10^{-2}
1.118	7.480×10^{-2}	3.119×10^{-3}
1.325	2.572×10^{-2}	9.564×10^{-4}
1.547	8.347×10^{-3}	3.607×10^{-4}
1.763	2.862×10^{-3}	1.595×10^{-4}
1.989	8.850×10^{-4}	7.577×10^{-5}
2.222	2.762×10^{-4}	3.915×10^{-5}
2.457	8.748×10^{-5}	2.107×10^{-5}
2.822	2.854×10^{-5}	8.657×10^{-6}

Incident Proton Momentum = 125 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.434	3.631×10^{0}	1.521×10^{-1}
0.668	9.578×10^{-1}	3.688×10^{-2}
0.891	2.942×10^{-1}	1.158×10^{-2}
1.119	8.777×10^{-2}	3.602×10^{-3}
1.324	3.142×10^{-2}	1.135×10^{-3}
1.547	1.080×10^{-2}	4.525×10^{-4}
1.768	3.972×10^{-3}	2.119×10^{-4}
1.987	1.383×10^{-3}	1.058×10^{-4}
2.202	4.289×10^{-4}	5.359×10^{-5}
2.402	2.065×10^{-4}	3.571×10^{-5}
2.632	9.352×10^{-5}	2.317×10^{-5}
2.981	1.787×10^{-5}	9.324×10^{-6}

Incident Proton Momentum = 150 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.437	3.806×10^{0}	1.085×10^{-1}
0.662	1.041×10^{0}	2.846×10^{-2}
0.880	3.237×10^{-1}	8.808×10^{-3}
1.111	9.995×10^{-2}	2.797×10^{-3}
1.323	3.606×10^{-2}	9.362×10^{-4}
1.545	1.305×10^{-2}	3.582×10^{-4}
1.763	4.800×10^{-3}	1.481×10^{-4}
1.983	1.996×10^{-3}	7.424×10^{-5}
2.211	6.975×10^{-4}	3.641×10^{-5}
2.435	2.540×10^{-4}	1.978×10^{-5}
2.668	7.592×10^{-5}	1.012×10^{-5}
2.912	2.525×10^{-5}	5.599×10^{-6}
3.216	7.870×10^{-6}	2.578×10^{-6}
3.595	1.850×10^{-6}	1.047×10^{-6}

Laboratory Angle = 65 Milliradians

Incident Proton Momentum = 175 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.434	3.863×10^{0}	1.146×10^{-1}
0.664	9.963×10^{-1}	2.862×10^{-2}
0.881	3.054×10^{-1}	8.759×10^{-3}
1.110	9.829×10^{-2}	2.884×10^{-3}
1.326	3.445×10^{-2}	9.393×10^{-4}
1.544	1.300×10^{-2}	3.735×10^{-4}
1.765	4.987×10^{-3}	1.622×10^{-4}
1.985	1.890×10^{-3}	7.604×10^{-5}
2.205	7.483×10^{-4}	4.045×10^{-5}
2.432	3.013×10^{-4}	2.319×10^{-5}
2.642	1.338×10^{-4}	1.441×10^{-5}
2.852	3.334×10^{-5}	6.777×10^{-6}
3.102	2.487×10^{-5}	5.611×10^{-6}
3.368	8.427×10^{-6}	3.143×10^{-6}

Incident Proton Momentum = 225 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.437	3.937×10^{0}	1.679×10^{-1}
0.663	1.087×10^{0}	4.471×10^{-2}
0.878	3.468×10^{-1}	1.407×10^{-2}
1.105	1.099×10^{-1}	4.566×10^{-3}
1.324	4.121×10^{-2}	1.608×10^{-3}
1.546	1.583×10^{-2}	6.438×10^{-4}
1.767	5.896×10^{-3}	2.633×10^{-4}
1.983	2.470×10^{-3}	1.272×10^{-4}
2.210	9.068×10^{-4}	6.195×10^{-5}
2.433	4.242×10^{-4}	3.775×10^{-5}
2.646	2.137×10^{-4}	2.461×10^{-5}
2.878	4.077×10^{-5}	1.003×10^{-5}
3.090	2.640×10^{-5}	7.634×10^{-6}
3.429	6.197×10^{-6}	3.336×10^{-6}

Incident Proton Momentum = 200 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.437	3.874×10^{0}	1.362×10^{-1}
0.663	1.045×10^{0}	3.537×10^{-2}
0.878	3.364×10^{-1}	1.123×10^{-2}
1.110	1.028×10^{-1}	3.551×10^{-3}
1.325	3.776×10^{-2}	1.218×10^{-3}
1.544	1.424×10^{-2}	4.775×10^{-4}
1.762	5.794×10^{-3}	2.116×10^{-4}
1.987	2.169×10^{-3}	9.575×10^{-5}
2.215	7.913×10^{-4}	4.707×10^{-5}
2.429	3.604×10^{-4}	2.824×10^{-5}
2.653	1.768×10^{-4}	1.835×10^{-5}
2.890	5.129×10^{-5}	9.215×10^{-6}
3.104	1.931×10^{-5}	5.353×10^{-6}
3.381	4.650×10^{-6}	2.736×10^{-6}

Incident Proton Momentum = 250 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.434	3.977×10^{0}	1.924×10^{-1}
0.664	1.021×10^{0}	4.819×10^{-2}
0.877	3.346×10^{-1}	1.550×10^{-2}
1.109	1.068×10^{-1}	5.099×10^{-3}
1.326	3.825×10^{-2}	1.712×10^{-3}
1.545	1.431×10^{-2}	6.677×10^{-4}
1.771	5.841×10^{-3}	3.006×10^{-4}
1.987	2.379×10^{-3}	1.426×10^{-4}
2.197	1.077×10^{-3}	7.888×10^{-5}
2.423	4.178×10^{-4}	4.251×10^{-5}
2.654	1.335×10^{-4}	2.186×10^{-5}
2.863	7.147×10^{-5}	1.507×10^{-5}
3.402	8.044×10^{-6}	3.359×10^{-6}

Incident Proton Momentum = 275 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.439	3.949×10^{0}	2.550×10^{-1}
0.661	1.038×10^{0}	6.310×10^{-2}
0.882	3.009×10^{-1}	1.854×10^{-2}
1.109	1.110×10^{-1}	6.909×10^{-3}
1.323	4.108×10^{-2}	2.352×10^{-3}
1.543	1.475×10^{-2}	8.949×10^{-4}
1.768	5.617×10^{-3}	3.869×10^{-4}
1.990	2.134×10^{-3}	1.822×10^{-4}
2.216	9.357×10^{-4}	1.028×10^{-4}
2.434	4.686×10^{-4}	6.500×10^{-5}
2.651	1.310×10^{-4}	3.116×10^{-5}
3.258	2.859×10^{-5}	8.680×10^{-6}

Laboratory Angle = 80 Milliradians

Incident Proton Momentum = 50.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.408	3.978×10^{0}	1.594×10^{-1}
0.646	1.027×10^{0}	6.048×10^{-2}
0.936	1.755×10^{-1}	1.258×10^{-2}
1.140	6.000×10^{-2}	2.863×10^{-3}
1.379	1.418×10^{-2}	9.471×10^{-4}
1.618	2.819×10^{-3}	3.592×10^{-4}
1.875	5.941×10^{-4}	6.005×10^{-5}
2.112	9.935×10^{-5}	1.944×10^{-5}
2.409	6.694×10^{-6}	4.493×10^{-6}

Incident Proton Momentum = 75.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.405	4.379×10^{0}	1.740×10^{-1}
0.644	1.059×10^{0}	6.447×10^{-2}
0.937	2.232×10^{-1}	1.500×10^{-2}
1.143	7.375×10^{-2}	3.311×10^{-3}
1.375	2.298×10^{-2}	1.270×10^{-3}
1.626	6.732×10^{-3}	5.643×10^{-4}
1.871	2.121×10^{-3}	1.358×10^{-4}
2.107	6.513×10^{-4}	5.990×10^{-5}
2.417	2.881×10^{-5}	1.124×10^{-5}
2.707	2.764×10^{-5}	8.918×10^{-6}

Incident Proton Momentum = 100.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.406	4.658×10^{0}	2.008×10^{-1}
0.642	1.364×10^{0}	8.260×10^{-2}
0.932	2.815×10^{-1}	2.027×10^{-2}
1.138	1.047×10^{-1}	4.908×10^{-3}
1.385	2.999×10^{-2}	1.710×10^{-3}
1.621	9.148×10^{-3}	7.177×10^{-4}
1.868	3.411×10^{-3}	1.989×10^{-4}
2.113	1.186×10^{-3}	8.969×10^{-5}
2.340	3.678×10^{-4}	4.197×10^{-5}
2.599	1.479×10^{-4}	2.526×10^{-5}
2.763	8.695×10^{-6}	5.867×10^{-6}

Incident Proton Momentum = 125.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.406	4.628×10^{0}	1.872×10^{-1}
0.637	1.340×10^{0}	7.562×10^{-2}
0.937	2.455×10^{-1}	1.624×10^{-2}
1.138	9.214×10^{-2}	3.957×10^{-3}
1.377	2.789×10^{-2}	1.469×10^{-3}
1.612	1.026×10^{-2}	7.225×10^{-4}
1.867	3.283×10^{-3}	1.791×10^{-4}
2.105	1.171×10^{-3}	8.149×10^{-5}
2.355	3.511×10^{-4}	3.776×10^{-5}
2.614	1.144×10^{-4}	2.009×10^{-5}
2.865	3.039×10^{-5}	9.826×10^{-6}
3.061	9.377×10^{-6}	5.262×10^{-6}
3.267	7.946×10^{-6}	7.892×10^{-6}

Incident Proton Momentum = 150.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.409	4.925×10^{0}	1.133×10^{-1}
0.640	1.410×10^{0}	4.157×10^{-2}
0.925	3.344×10^{-1}	1.175×10^{-2}
1.141	1.227×10^{-1}	3.042×10^{-3}
1.383	4.045×10^{-2}	1.149×10^{-3}
1.617	1.417×10^{-2}	5.119×10^{-4}
1.869	4.833×10^{-3}	1.421×10^{-4}
2.108	1.807×10^{-3}	6.347×10^{-5}
2.346	6.222×10^{-4}	2.997×10^{-5}
2.588	2.174×10^{-4}	1.588×10^{-5}
2.837	6.020×10^{-5}	7.892×10^{-6}
3.059	3.020×10^{-5}	5.424×10^{-6}
3.241	4.641×10^{-6}	2.074×10^{-6}
3.724	2.787×10^{-6}	1.372×10^{-6}

Incident Proton Momentum = 175.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.406	5.069×10^{0}	1.121×10^{-1}
0.642	1.394×10^{0}	4.013×10^{-2}
0.925	3.474×10^{-1}	1.182×10^{-2}
1.139	1.273×10^{-1}	3.119×10^{-3}
1.376	4.308×10^{-2}	1.211×10^{-3}
1.618	1.420×10^{-2}	5.288×10^{-4}
1.870	4.689×10^{-3}	1.364×10^{-4}
2.106	1.788×10^{-3}	6.214×10^{-5}
2.353	6.410×10^{-4}	3.071×10^{-5}
2.590	2.567×10^{-4}	1.748×10^{-5}
2.837	9.074×10^{-5}	9.781×10^{-6}
3.097	2.880×10^{-5}	5.293×10^{-6}
3.421	7.641×10^{-6}	2.177×10^{-6}

Laboratory Angle = 80 Milliradians

Incident Proton Momentum = 200.9 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.412	4.898×10^{0}	1.134×10^{-1}
0.647	1.454×10^{0}	4.187×10^{-2}
0.923	3.569×10^{-1}	1.206×10^{-2}
1.141	1.289×10^{-1}	3.214×10^{-3}
1.379	4.283×10^{-2}	1.257×10^{-3}
1.611	1.669×10^{-2}	6.203×10^{-4}
1.857	5.648×10^{-3}	1.645×10^{-4}
2.103	2.074×10^{-3}	7.402×10^{-5}
2.345	8.674×10^{-4}	4.043×10^{-5}
2.582	3.074×10^{-4}	2.148×10^{-5}
2.838	1.016×10^{-4}	1.160×10^{-5}
3.073	3.442×10^{-5}	6.471×10^{-6}
3.317	1.670×10^{-5}	4.359×10^{-6}
3.531	4.177×10^{-6}	2.524×10^{-6}

Incident Proton Momentum = 250.9 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.409	5.176×10^{0}	1.243×10^{-1}
0.648	1.456×10^{0}	4.390×10^{-2}
0.923	3.801×10^{-1}	1.314×10^{-2}
1.138	1.421×10^{-1}	3.640×10^{-3}
1.377	4.909×10^{-2}	1.482×10^{-3}
1.611	1.759×10^{-2}	6.984×10^{-4}
1.867	5.789×10^{-3}	1.796×10^{-4}
2.107	2.180×10^{-3}	8.174×10^{-5}
2.348	8.783×10^{-4}	4.324×10^{-5}
2.585	3.375×10^{-4}	2.388×10^{-5}
2.837	1.329×10^{-4}	1.410×10^{-5}
3.138	1.665×10^{-5}	4.771×10^{-6}
3.332	1.775×10^{-5}	4.771×10^{-6}
3.731	5.948×10^{-6}	2.017×10^{-6}

Incident Proton Momentum = 225.9 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.408	5.048×10^{0}	1.149×10^{-1}
0.645	1.395×10^{0}	4.034×10^{-2}
0.921	3.478×10^{-1}	1.204×10^{-2}
1.136	1.316×10^{-1}	3.367×10^{-3}
1.377	4.428×10^{-2}	1.331×10^{-3}
1.619	1.493×10^{-2}	6.023×10^{-4}
1.869	5.252×10^{-3}	1.640×10^{-4}
2.106	1.986×10^{-3}	7.476×10^{-5}
2.348	8.170×10^{-4}	4.008×10^{-5}
2.581	2.984×10^{-4}	2.143×10^{-5}
2.829	1.062×10^{-4}	1.195×10^{-5}
3.090	4.516×10^{-5}	7.487×10^{-6}
3.302	2.098×10^{-5}	4.896×10^{-6}
3.737	4.134×10^{-6}	1.871×10^{-6}

Incident Proton Momentum = 275.9 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.411	5.135×10^{0}	1.353×10^{-1}
0.644	1.492×10^{0}	4.901×10^{-2}
0.923	3.726×10^{-1}	1.426×10^{-2}
1.138	1.405×10^{-1}	3.979×10^{-3}
1.379	4.793×10^{-2}	1.639×10^{-3}
1.617	1.652×10^{-2}	7.673×10^{-4}
1.868	6.140×10^{-3}	2.037×10^{-4}
2.109	2.212×10^{-3}	8.925×10^{-5}
2.352	9.588×10^{-4}	4.912×10^{-5}
2.591	4.114×10^{-4}	2.858×10^{-5}
2.828	1.560×10^{-4}	1.629×10^{-5}
3.094	3.657×10^{-5}	7.488×10^{-6}
3.339	1.370×10^{-5}	4.406×10^{-6}
3.716	4.554×10^{-6}	2.032×10^{-6}

Incident Proton Momentum = 300.9 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.410	5.330×10^{0}	1.571×10^{-1}
0.641	1.628×10^{0}	5.963×10^{-2}
0.921	4.244×10^{-1}	1.861×10^{-2}
1.134	1.663×10^{-1}	5.582×10^{-3}
1.374	5.666×10^{-2}	2.382×10^{-3}
1.612	2.146×10^{-2}	1.225×10^{-3}
1.863	7.292×10^{-3}	2.957×10^{-4}
2.103	2.807×10^{-3}	1.461×10^{-4}
2.353	1.036×10^{-3}	7.763×10^{-5}
2.591	3.780×10^{-4}	4.325×10^{-5}
2.852	1.444×10^{-4}	2.558×10^{-5}
3.054	7.394×10^{-5}	1.762×10^{-5}
3.610	1.225×10^{-5}	5.772×10^{-6}

Laboratory Angle = 100 Milliradians

Incident Proton Momentum = 50 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.424	3.875×10^{0}	1.149×10^{-1}
0.624	1.292×10^{0}	4.986×10^{-2}
0.829	4.340×10^{-1}	2.533×10^{-2}
1.081	1.003×10^{-1}	4.773×10^{-3}
1.261	3.896×10^{-2}	1.467×10^{-3}
1.466	1.250×10^{-2}	5.833×10^{-4}
1.673	3.930×10^{-3}	2.685×10^{-4}
1.917	9.131×10^{-4}	8.667×10^{-5}
2.103	2.654×10^{-4}	2.507×10^{-5}
2.306	6.411×10^{-5}	1.030×10^{-5}
2.522	1.161×10^{-5}	4.100×10^{-6}
2.934	2.505×10^{-6}	1.959×10^{-6}

Incident Proton Momentum = 75 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.425	4.238×10^{0}	1.429×10^{-1}
0.627	1.321×10^{0}	5.581×10^{-2}
0.828	4.545×10^{-1}	2.719×10^{-2}
1.078	1.188×10^{-1}	5.949×10^{-3}
1.262	4.888×10^{-2}	1.935×10^{-3}
1.460	1.723×10^{-2}	7.831×10^{-4}
1.670	6.216×10^{-3}	3.728×10^{-4}
1.912	1.651×10^{-3}	1.204×10^{-4}
2.097	6.651×10^{-4}	4.351×10^{-5}
2.299	2.535×10^{-4}	2.287×10^{-5}
2.507	8.887×10^{-5}	1.250×10^{-5}
2.753	1.377×10^{-5}	4.732×10^{-6}
2.930	8.729×10^{-6}	3.731×10^{-6}

Incident Proton Momentum = 100 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.421	4.705×10^{0}	1.749×10^{-1}
0.625	1.648×10^{0}	7.296×10^{-2}
0.829	5.185×10^{-1}	3.252×10^{-2}
1.076	1.451×10^{-1}	7.861×10^{-3}
1.262	5.898×10^{-2}	2.542×10^{-3}
1.466	2.188×10^{-2}	1.060×10^{-3}
1.669	8.924×10^{-3}	5.281×10^{-4}
1.902	2.258×10^{-3}	1.707×10^{-4}
2.086	1.073×10^{-3}	6.853×10^{-5}
2.300	3.617×10^{-4}	3.127×10^{-5}
2.514	1.324×10^{-4}	1.682×10^{-5}
2.718	7.145×10^{-5}	1.176×10^{-5}
2.922	2.475×10^{-5}	6.647×10^{-6}
3.123	7.740×10^{-6}	3.647×10^{-6}
3.357	4.659×10^{-6}	3.202×10^{-6}

Incident Proton Momentum = 125 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.426	5.046×10^{0}	2.040×10^{-1}
0.629	1.716×10^{0}	8.136×10^{-2}
0.828	6.394×10^{-1}	3.945×10^{-2}
1.071	2.016×10^{-1}	1.110×10^{-2}
1.261	8.251×10^{-2}	3.675×10^{-3}
1.462	3.075×10^{-2}	1.531×10^{-3}
1.676	1.101×10^{-2}	7.036×10^{-4}
1.902	4.723×10^{-3}	3.257×10^{-4}
2.091	1.794×10^{-3}	1.131×10^{-4}
2.288	7.139×10^{-4}	5.688×10^{-5}
2.509	2.493×10^{-4}	2.959×10^{-5}
2.706	1.164×10^{-4}	1.902×10^{-5}
2.928	3.133×10^{-5}	9.494×10^{-6}
3.244	7.888×10^{-6}	4.629×10^{-6}
3.539	3.689×10^{-6}	7.389×10^{-6}

Laboratory Angle = 100 Milliradians

Incident Proton Momentum = 150 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.427	4.821×10^{0}	1.425×10^{-1}
0.631	1.588×10^{0}	4.990×10^{-2}
0.837	5.348×10^{-1}	1.977×10^{-2}
1.068	1.662×10^{-1}	6.053×10^{-3}
1.260	6.752×10^{-2}	2.071×10^{-3}
1.466	2.519×10^{-2}	8.141×10^{-4}
1.678	9.733×10^{-3}	3.560×10^{-4}
1.898	3.527×10^{-3}	1.407×10^{-4}
2.095	1.558×10^{-3}	5.666×10^{-5}
2.304	6.273×10^{-4}	2.691×10^{-5}
2.508	2.631×10^{-4}	1.432×10^{-5}
2.717	1.143×10^{-4}	8.394×10^{-6}
2.920	3.801×10^{-5}	4.459×10^{-6}
3.126	2.244×10^{-5}	3.314×10^{-6}
3.335	7.290×10^{-6}	1.823×10^{-6}
3.882	1.711×10^{-6}	5.187×10^{-7}

Incident Proton Momentum = 200 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.426	5.165×10^{0}	1.582×10^{-1}
0.635	1.605×10^{0}	5.262×10^{-2}
0.836	5.677×10^{-1}	2.116×10^{-2}
1.065	1.852×10^{-1}	6.783×10^{-3}
1.260	7.537×10^{-2}	2.360×10^{-3}
1.463	3.002×10^{-2}	9.822×10^{-4}
1.674	1.193×10^{-2}	4.384×10^{-4}
1.898	4.475×10^{-3}	1.799×10^{-4}
2.092	2.061×10^{-3}	7.556×10^{-5}
2.301	8.750×10^{-4}	3.708×10^{-5}
2.504	3.592×10^{-4}	1.917×10^{-5}
2.718	1.354×10^{-4}	1.029×10^{-5}
2.921	7.712×10^{-5}	7.300×10^{-6}
3.134	3.413×10^{-5}	4.587×10^{-6}
3.331	1.124×10^{-5}	2.524×10^{-6}
3.909	1.831×10^{-6}	6.169×10^{-7}
4.319	8.424×10^{-7}	1.083×10^{-6}

Incident Proton Momentum = 175 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.426	4.998×10^{0}	1.497×10^{-1}
0.634	1.563×10^{0}	5.026×10^{-2}
0.834	5.629×10^{-1}	2.058×10^{-2}
1.065	1.713×10^{-1}	6.347×10^{-3}
1.260	7.073×10^{-2}	2.230×10^{-3}
1.465	2.703×10^{-2}	8.939×10^{-4}
1.676	1.071×10^{-2}	3.965×10^{-4}
1.895	4.155×10^{-3}	1.684×10^{-4}
2.091	1.890×10^{-3}	7.102×10^{-5}
2.302	7.839×10^{-4}	3.423×10^{-5}
2.514	3.085×10^{-4}	1.731×10^{-5}
2.718	1.469×10^{-4}	1.056×10^{-5}
2.945	5.125×10^{-5}	5.757×10^{-6}
3.120	3.158×10^{-5}	4.284×10^{-6}
3.345	8.071×10^{-6}	2.065×10^{-6}
3.898	1.474×10^{-6}	5.661×10^{-7}

Incident Proton Momentum = 225 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.426	5.207×10^{0}	1.576×10^{-1}
0.631	1.643×10^{0}	5.275×10^{-2}
0.837	5.546×10^{-1}	2.063×10^{-2}
1.064	1.802×10^{-1}	6.662×10^{-3}
1.260	7.308×10^{-2}	2.325×10^{-3}
1.468	2.855×10^{-2}	9.601×10^{-4}
1.676	1.110×10^{-2}	4.206×10^{-4}
1.897	4.202×10^{-3}	1.738×10^{-4}
2.095	1.804×10^{-3}	6.865×10^{-5}
2.299	8.500×10^{-4}	3.641×10^{-5}
2.511	3.590×10^{-4}	1.919×10^{-5}
2.717	1.513×10^{-4}	1.084×10^{-5}
2.941	6.134×10^{-5}	6.371×10^{-6}
3.139	2.696×10^{-5}	3.978×10^{-6}
3.334	1.735×10^{-5}	3.069×10^{-6}
3.647	3.170×10^{-6}	1.113×10^{-6}

Laboratory Angle = 100 Milliradians

Incident Proton Momentum = 250 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.425	5.411×10^{0}	1.693×10^{-1}
0.629	1.754×10^{0}	5.766×10^{-2}
0.839	5.859×10^{-1}	2.219×10^{-2}
1.063	1.951×10^{-1}	7.403×10^{-3}
1.258	8.145×10^{-2}	2.684×10^{-3}
1.466	3.141×10^{-2}	1.101×10^{-3}
1.676	1.291×10^{-2}	5.064×10^{-4}
1.896	5.037×10^{-3}	2.149×10^{-4}
2.093	2.356×10^{-3}	9.154×10^{-5}
2.302	1.032×10^{-3}	4.604×10^{-5}
2.506	4.316×10^{-4}	2.391×10^{-5}
2.716	2.466×10^{-4}	1.633×10^{-5}
2.914	9.633×10^{-5}	9.179×10^{-6}
3.138	3.169×10^{-5}	4.922×10^{-6}
3.354	1.091×10^{-5}	2.771×10^{-6}
3.906	2.761×10^{-6}	7.271×10^{-7}

Incident Proton Momentum = 300 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.426	5.273×10^{0}	1.675×10^{-1}
0.634	1.678×10^{0}	5.746×10^{-2}
0.836	5.684×10^{-1}	2.273×10^{-2}
1.065	1.839×10^{-1}	7.309×10^{-3}
1.258	7.909×10^{-2}	2.688×10^{-3}
1.467	3.143×10^{-2}	1.159×10^{-3}
1.667	1.237×10^{-2}	5.269×10^{-4}
1.896	4.920×10^{-3}	2.306×10^{-4}
2.093	2.272×10^{-3}	9.638×10^{-5}
2.295	1.078×10^{-3}	5.250×10^{-5}
2.510	4.777×10^{-4}	2.939×10^{-5}
2.720	1.856×10^{-4}	1.607×10^{-5}
2.912	1.025×10^{-4}	1.115×10^{-5}
3.116	4.414×10^{-5}	6.899×10^{-6}
3.330	1.972×10^{-5}	4.403×10^{-6}
3.868	3.949×10^{-6}	1.196×10^{-6}

Incident Proton Momentum = 275 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.427	5.177×10^{0}	1.632×10^{-1}
0.633	1.682×10^{0}	5.590×10^{-2}
0.836	5.887×10^{-1}	2.208×10^{-2}
1.066	1.850×10^{-1}	7.009×10^{-3}
1.261	7.513×10^{-2}	2.486×10^{-3}
1.467	3.014×10^{-2}	1.055×10^{-3}
1.671	1.225×10^{-2}	4.811×10^{-4}
1.900	4.920×10^{-3}	2.096×10^{-4}
2.093	2.162×10^{-3}	8.341×10^{-5}
2.304	9.172×10^{-4}	4.116×10^{-5}
2.510	4.217×10^{-4}	2.303×10^{-5}
2.720	1.930×10^{-4}	1.366×10^{-5}
2.928	8.162×10^{-5}	8.099×10^{-6}
3.141	3.217×10^{-5}	4.778×10^{-6}
3.345	1.972×10^{-5}	3.587×10^{-6}
3.841	2.709×10^{-6}	8.210×10^{-7}

Incident Proton Momentum = 325 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.428	5.296×10^{0}	1.921×10^{-1}
0.632	1.742×10^{0}	6.997×10^{-2}
0.833	5.964×10^{-1}	2.967×10^{-2}
1.067	1.842×10^{-1}	9.042×10^{-3}
1.257	8.400×10^{-2}	3.431×10^{-3}
1.463	3.314×10^{-2}	1.490×10^{-3}
1.668	1.377×10^{-2}	7.324×10^{-4}
1.901	5.257×10^{-3}	3.137×10^{-4}
2.089	2.518×10^{-3}	1.329×10^{-4}
2.305	9.985×10^{-4}	6.585×10^{-5}
2.502	5.159×10^{-4}	4.111×10^{-5}
2.715	2.236×10^{-4}	2.439×10^{-5}
2.925	9.705×10^{-5}	1.496×10^{-5}
3.492	1.233×10^{-5}	2.912×10^{-6}
3.779	6.631×10^{-6}	4.467×10^{-6}

Laboratory Angle = 100 Milliradians

Incident Proton Momentum = 350 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.423	5.620×10^{0}	2.141×10^{-1}
0.632	1.569×10^{0}	7.344×10^{-2}
0.835	5.972×10^{-1}	3.303×10^{-2}
1.071	1.926×10^{-1}	1.003×10^{-2}
1.253	8.903×10^{-2}	3.901×10^{-3}
1.462	3.267×10^{-2}	1.729×10^{-3}
1.665	1.635×10^{-2}	1.041×10^{-3}
1.902	4.517×10^{-3}	4.021×10^{-4}
2.089	2.466×10^{-3}	2.034×10^{-4}
2.297	1.025×10^{-3}	1.129×10^{-4}
2.494	5.839×10^{-4}	7.809×10^{-5}
2.735	9.557×10^{-5}	2.913×10^{-5}
2.929	1.058×10^{-4}	2.959×10^{-5}
3.154	3.134×10^{-5}	1.537×10^{-5}
3.313	3.113×10^{-5}	1.758×10^{-5}

Incident Proton Momentum = 400 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.427	5.271×10^{0}	1.804×10^{-1}
0.629	1.614×10^{0}	6.167×10^{-2}
0.833	5.506×10^{-1}	2.628×10^{-2}
1.069	1.575×10^{-1}	7.359×10^{-3}
1.260	6.758×10^{-2}	2.544×10^{-3}
1.465	2.702×10^{-2}	1.055×10^{-3}
1.672	1.213×10^{-2}	5.102×10^{-4}
1.885	4.666×10^{-3}	2.250×10^{-4}
2.087	2.217×10^{-3}	1.168×10^{-4}
2.291	1.010×10^{-3}	6.503×10^{-5}
2.504	4.841×10^{-4}	3.975×10^{-5}
2.715	2.068×10^{-4}	2.356×10^{-5}
2.913	1.032×10^{-4}	1.557×10^{-5}
3.123	2.296×10^{-5}	6.874×10^{-6}
3.341	1.374×10^{-5}	5.067×10^{-6}
3.905	4.139×10^{-6}	1.768×10^{-6}
4.319	1.434×10^{-6}	2.874×10^{-6}

Incident Proton Momentum = 375 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.426	4.970×10^{0}	1.782×10^{-1}
0.629	1.602×10^{0}	6.630×10^{-2}
0.834	5.203×10^{-1}	2.858×10^{-2}
1.075	1.470×10^{-1}	7.672×10^{-3}
1.256	6.510×10^{-2}	2.779×10^{-3}
1.463	2.648×10^{-2}	1.288×10^{-3}
1.672	1.142×10^{-2}	6.789×10^{-4}
1.883	4.111×10^{-3}	3.307×10^{-4}
2.088	2.508×10^{-3}	2.194×10^{-4}
2.298	9.154×10^{-4}	1.126×10^{-4}
2.492	4.378×10^{-4}	7.111×10^{-5}
2.714	2.545×10^{-4}	5.082×10^{-5}
2.941	4.785×10^{-5}	2.034×10^{-5}
3.197	3.423×10^{-5}	1.442×10^{-5}

Laboratory Angle = 120 Milliradians

Incident Proton Momentum = 48.9 GeV/c		
$p_{\perp}$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.427	5.888×10^{0}	2.349×10^{-1}
0.687	1.334×10^{0}	7.971×10^{-2}
0.930	3.557×10^{-1}	3.612×10^{-2}
1.220	7.770×10^{-2}	5.409×10^{-3}
1.462	2.297×10^{-2}	1.790×10^{-3}
1.757	2.973×10^{-3}	4.631×10^{-4}
2.005	1.169×10^{-3}	1.604×10^{-4}
2.235	3.798×10^{-4}	5.100×10^{-5}
2.501	7.046×10^{-5}	1.542×10^{-5}
2.890	6.032×10^{-6}	4.836×10^{-6}

Incident Proton Momentum = 73.9 GeV/c		
$p_{\perp}$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.437	5.423×10^{0}	2.317×10^{-1}
0.682	1.468×10^{0}	8.672×10^{-2}
0.918	4.359×10^{-1}	4.080×10^{-2}
1.217	9.720×10^{-2}	6.164×10^{-3}
1.465	2.760×10^{-2}	1.892×10^{-3}
1.734	6.238×10^{-3}	5.995×10^{-4}
1.990	2.482×10^{-3}	2.209×10^{-4}
2.242	9.190×10^{-4}	7.696×10^{-5}
2.497	2.548×10^{-4}	2.792×10^{-5}
2.748	7.170×10^{-5}	1.224×10^{-5}
3.297	8.454×10^{-6}	2.817×10^{-6}

Incident Proton Momentum = 98.9 GeV/c		
$p_{\perp}$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.429	6.263×10^{0}	2.617×10^{-1}
0.682	1.489×10^{0}	8.998×10^{-2}
0.931	3.697×10^{-1}	3.871×10^{-2}
1.209	1.314×10^{-1}	7.650×10^{-3}
1.463	3.703×10^{-2}	2.385×10^{-3}
1.715	1.096×10^{-2}	9.003×10^{-4}
1.994	3.048×10^{-3}	2.561×10^{-4}
2.246	1.143×10^{-3}	8.940×10^{-5}
2.508	3.160×10^{-4}	3.207×10^{-5}
2.747	1.190×10^{-4}	1.615×10^{-5}
3.024	3.422×10^{-5}	7.791×10^{-6}
3.497	6.960×10^{-6}	2.601×10^{-6}

Incident Proton Momentum = 123.9 GeV/c		
$p_{\perp}$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.428	6.371×10^{0}	2.678×10^{-1}
0.672	1.696×10^{0}	9.847×10^{-2}
0.942	4.224×10^{-1}	4.2[illegible]1 $\times10^{-2}$
1.210	1.117×10^{-1}	7.023×10^{-3}
1.467	3.351×10^{-2}	2.307×10^{-3}
1.720	1.067×10^{-2}	8.928×10^{-4}
2.002	2.706×10^{-3}	2.352×10^{-4}
2.242	1.144×10^{-3}	9.094×10^{-5}
2.498	3.248×10^{-4}	3.200×10^{-5}
2.755	1.158×10^{-4}	1.515×10^{-5}
3.086	2.756×10^{-5}	5.482×10^{-6}
3.438	6.085×10^{-6}	3.618×10^{-6}

Incident Proton Momentum = 158.9 GeV/c		
$p_{\perp}$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.435	6.216×10^{0}	1.224×10^{-1}
0.682	1.654×10^{0}	4.113×10^{-2}
0.936	4.760×10^{-1}	1.784×10^{-2}
1.208	1.233×10^{-1}	3.135×10^{-3}
1.463	3.855×10^{-2}	1.085×10^{-3}
1.714	1.307×10^{-2}	4.516×10^{-4}
1.995	3.645×10^{-3}	1.290×10^{-4}
2.239	1.469×10^{-3}	4.808×10^{-5}
2.497	5.159×10^{-4}	2.025×10^{-5}
2.750	1.686×10^{-4}	9.118×10^{-6}
3.003	6.813×10^{-5}	5.162×10^{-6}
3.279	1.895×10^{-5}	2.536×10^{-6}
3.885	2.095×10^{-6}	5.603×10^{-7}

Laboratory Angle = 120 Milliradians

Incident Proton Momentum = 183.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.432	6.417×10^{0}	1.262×10^{-1}
0.652	1.582×10^{0}	4.001×10^{-2}
0.933	4.646×10^{-1}	1.749×10^{-2}
1.207	1.261×10^{-1}	3.220×10^{-3}
1.463	3.793×10^{-2}	1.092×10^{-3}
1.717	1.310×10^{-2}	4.702×10^{-4}
1.998	3.812×10^{-3}	1.381×10^{-4}
2.240	1.599×10^{-3}	5.345×10^{-5}
2.494	5.756×10^{-4}	2.297×10^{-5}
2.750	2.277×10^{-4}	1.177×10^{-5}
3.007	8.439×10^{-5}	6.273×10^{-6}
3.251	2.738×10^{-5}	3.271×10^{-6}
3.908	3.468×10^{-6}	6.765×10^{-7}
4.234	4.328×10^{-7}	9.684×10^{-7}

Incident Proton Momentum = 233.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.435	6.456×10^{0}	1.461×10^{-1}
0.684	1.708×10^{0}	4.622×10^{-2}
0.934	4.686×10^{-1}	1.834×10^{-2}
1.210	1.261×10^{-1}	3.573×10^{-3}
1.464	3.990×10^{-2}	1.279×10^{-3}
1.716	1.356×10^{-2}	5.475×10^{-4}
1.998	4.179×10^{-3}	1.671×10^{-4}
2.240	1.744×10^{-3}	6.441×10^{-5}
2.492	6.311×10^{-4}	2.790×10^{-5}
2.749	2.505×10^{-4}	1.435×10^{-5}
3.003	9.553×10^{-5}	7.768×10^{-6}
3.266	3.636×10^{-5}	4.411×10^{-6}
3.859	4.446×10^{-6}	8.821×10^{-7}
4.507	6.213×10^{-7}	5.701×10^{-7}

Incident Proton Momentum = 208.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.435	6.226×10^{0}	1.320×10^{-1}
0.684	1.604×10^{0}	4.206×10^{-2}
0.933	4.718×10^{-1}	1.793×10^{-2}
1.207	1.164×10^{-1}	3.158×10^{-3}
1.461	3.769×10^{-2}	1.140×10^{-3}
1.713	1.206×10^{-2}	4.613×10^{-4}
1.997	3.586×10^{-3}	1.376×10^{-4}
2.239	1.489×10^{-3}	5.259×10^{-5}
2.495	5.303×10^{-4}	2.241×10^{-5}
2.747	1.962×10^{-4}	1.095×10^{-5}
3.008	6.856×10^{-5}	5.653×10^{-6}
3.272	2.349×10^{-5}	3.071×10^{-6}
3.898	3.054×10^{-6}	6.623×10^{-7}
4.411	5.454×10^{-7}	5.211×10^{-7}

Incident Proton Momentum = 258.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.436	6.419×10^{0}	1.582×10^{-1}
0.684	1.650×10^{0}	4.743×10^{-2}
0.936	4.721×10^{-1}	1.878×10^{-2}
1.208	1.257×10^{-1}	3.782×10^{-3}
1.461	4.126×10^{-2}	1.399×10^{-3}
1.710	1.419×10^{-2}	6.026×10^{-4}
1.997	4.168×10^{-3}	1.783×10^{-4}
2.239	1.756×10^{-3}	6.945×10^{-5}
2.499	6.393×10^{-4}	3.051×10^{-5}
2.751	2.551×10^{-4}	1.561×10^{-5}
3.003	1.014×10^{-4}	8.637×10^{-6}
3.262	4.244×10^{-5}	5.123×10^{-6}
3.883	3.883×10^{-6}	9.556×10^{-7}
4.433	1.165×10^{-6}	7.898×10^{-7}

Laboratory Angle = 120 Milliradians

Incident Proton Momentum = 283.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.433	6.566×10^{0}	2.136×10^{-1}
0.684	1.835×10^{0}	6.610×10^{-2}
0.934	5.505×10^{-1}	2.702×10^{-2}
1.208	1.546×10^{-1}	5.603×10^{-3}
1.461	5.163×10^{-2}	2.049×10^{-3}
1.719	1.756×10^{-2}	8.527×10^{-4}
1.996	5.724×10^{-3}	2.700×10^{-4}
2.239	2.444×10^{-3}	1.037×10^{-4}
2.490	9.611×10^{-4}	4.508×10^{-5}
2.751	3.543×10^{-4}	2.071×10^{-5}
3.013	1.362×10^{-4}	1.070×10^{-5}
3.266	5.179×10^{-5}	5.872×10^{-6}
3.872	6.756×10^{-6}	1.158×10^{-6}
4.520	1.227×10^{-6}	7.381×10^{-7}

Incident Proton Momentum = 308.9 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.434	7.026×10^{0}	3.785×10^{-1}
0.676	1.853×10^{0}	1.307×10^{-1}
0.939	4.236×10^{-1}	5.173×10^{-2}
1.208	1.707×10^{-1}	1.223×10^{-2}
1.463	5.526×10^{-2}	4.621×10^{-3}
1.732	1.753×10^{-2}	2.026×10^{-3}
1.993	5.820×10^{-3}	6.091×10^{-4}
2.239	2.490×10^{-3}	2.232×10^{-4}
2.497	8.010×10^{-4}	8.399×10^{-5}
2.764	3.106×10^{-4}	4.151×10^{-5}
3.015	8.242×10^{-5}	1.790×10^{-5}
3.685	1.784×10^{-5}	4.669×10^{-6}

Laboratory Angle = 200 Milliradians

Incident Proton Momentum = 50 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.454	4.992×10^{0}	2.493×10^{-1}
0.673	1.317×10^{0}	7.793×10^{-2}
0.911	3.136×10^{-1}	1.808×10^{-2}
1.115	1.139×10^{-1}	6.198×10^{-3}
1.332	3.528×10^{-2}	2.489×10^{-3}
1.557	1.017×10^{-2}	5.202×10^{-4}
1.779	3.440×10^{-3}	2.138×10^{-4}
2.000	1.120×10^{-3}	9.690×10^{-5}
2.205	3.869×10^{-4}	5.027×10^{-5}
2.449	7.824×10^{-5}	2.115×10^{-5}

Incident Proton Momentum = 75 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.453	5.090×10^{0}	2.457×10^{-1}
0.673	1.365×10^{0}	7.938×10^{-2}
0.909	3.468×10^{-1}	1.913×10^{-2}
1.110	1.258×10^{-1}	6.494×10^{-3}
1.326	4.218×10^{-2}	2.780×10^{-3}
1.550	1.236×10^{-2}	5.913×10^{-4}
1.781	4.368×10^{-3}	2.547×10^{-4}
1.997	1.629×10^{-3}	1.234×10^{-4}
2.213	5.790×10^{-4}	6.380×10^{-5}
2.441	1.398×10^{-4}	2.862×10^{-5}
2.669	9.973×10^{-5}	2.349×10^{-5}
2.812	6.004×10^{-5}	2.496×10^{-5}

Incident Proton Momentum = 100 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.453	5.183×10^{0}	2.525×10^{-1}
0.673	1.323×10^{0}	7.935×10^{-2}
0.910	3.614×10^{-1}	2.026×10^{-2}
1.118	1.236×10^{-1}	6.671×10^{-3}
1.330	4.384×10^{-2}	2.949×10^{-3}
1.555	1.390×10^{-2}	6.683×10^{-4}
1.771	5.297×10^{-3}	2.935×10^{-4}
2.001	1.744×10^{-3}	1.311×10^{-4}
2.212	7.090×10^{-4}	7.255×10^{-5}
2.439	2.386×10^{-4}	3.850×10^{-5}
2.668	1.005×10^{-4}	2.372×10^{-5}
2.888	3.944×10^{-5}	1.419×10^{-5}
3.131	1.536×10^{-5}	8.522×10^{-6}
3.315	8.577×10^{-6}	6.085×10^{-6}

Incident Proton Momentum = 125 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.454	5.171×10^{0}	2.748×10^{-1}
0.671	1.421×10^{0}	9.119×10^{-2}
0.911	3.778×10^{-1}	2.287×10^{-2}
1.112	1.367×10^{-1}	7.771×10^{-3}
1.333	4.566×10^{-2}	3.343×10^{-3}
1.554	1.516×10^{-2}	7.812×10^{-4}
1.774	5.927×10^{-3}	3.521×10^{-4}
1.998	2.281×10^{-3}	1.721×10^{-4}
2.220	7.292×10^{-4}	8.201×10^{-5}
2.434	3.890×10^{-4}	5.575×10^{-5}
2.653	1.306×10^{-4}	3.015×10^{-5}
2.908	2.051×10^{-5}	1.138×10^{-5}
3.344	5.589×10^{-6}	4.514×10^{-6}

Incident Proton Momentum = 150 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.454	5.224×10^{0}	1.638×10^{-1}
0.673	1.411×10^{0}	5.060×10^{-2}
0.906	3.801×10^{-1}	1.318×10^{-2}
1.112	1.379×10^{-1}	4.451×10^{-3}
1.332	4.616×10^{-2}	1.802×10^{-3}
1.553	1.566×10^{-2}	4.699×10^{-4}
1.778	6.131×10^{-3}	2.058×10^{-4}
1.997	2.289×10^{-3}	9.275×10^{-5}
2.216	9.001×10^{-4}	4.768×10^{-5}
2.442	3.027×10^{-4}	2.408×10^{-5}
2.658	1.452×10^{-4}	1.550×10^{-5}
2.895	4.690×10^{-5}	8.270×10^{-6}
3.106	3.095×10^{-5}	6.399×10^{-6}
3.333	6.093×10^{-6}	2.677×10^{-6}
3.774	4.642×10^{-6}	1.293×10^{-6}

Laboratory Angle = 200 Milliradians

Incident Proton Momentum = 175 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.455	5.161×10^{0}	1.657×10^{-1}
0.659	1.444×10^{0}	5.260×10^{-2}
0.908	3.845×10^{-1}	1.365×10^{-2}
1.114	1.408×10^{-1}	4.668×10^{-3}
1.331	4.885×10^{-2}	1.945×10^{-3}
1.554	1.644×10^{-2}	5.020×10^{-4}
1.777	6.555×10^{-3}	2.226×10^{-4}
1.998	2.435×10^{-3}	1.006×10^{-4}
2.221	8.977×10^{-4}	4.988×10^{-5}
2.436	4.132×10^{-4}	3.022×10^{-5}
2.660	1.526×10^{-4}	1.680×10^{-5}
2.876	7.149×10^{-5}	1.083×10^{-5}
3.102	1.644×10^{-5}	4.877×10^{-6}
3.326	1.845×10^{-5}	4.951×10^{-6}
3.796	3.294×10^{-6}	1.211×10^{-6}

Incident Proton Momentum = 225 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.454	5.113×10^{0}	1.844×10^{-1}
0.674	1.374×10^{0}	5.759×10^{-2}
0.907	3.902×10^{-1}	1.561×10^{-2}
1.117	1.331×10^{-1}	5.054×10^{-3}
1.332	4.810×10^{-2}	2.164×10^{-3}
1.552	1.728×10^{-2}	5.918×10^{-4}
1.776	6.668×10^{-3}	2.532×10^{-4}
1.996	2.631×10^{-3}	1.180×10^{-4}
2.219	1.062×10^{-3}	6.128×10^{-5}
2.446	4.316×10^{-4}	3.426×10^{-5}
2.663	1.732×10^{-4}	1.969×10^{-5}
2.887	7.952×10^{-5}	1.251×10^{-5}
3.101	2.289×10^{-5}	6.276×10^{-6}
3.320	1.955×10^{-5}	5.524×10^{-6}
3.793	5.183×10^{-6}	1.539×10^{-6}

Incident Proton Momentum = 200 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.454	5.424×10^{0}	1.798×10^{-1}
0.672	1.417×10^{0}	5.472×10^{-2}
0.907	4.095×10^{-1}	1.510×10^{-2}
1.115	1.418×10^{-1}	4.928×10^{-3}
1.334	4.945×10^{-2}	2.080×10^{-3}
1.555	1.770×10^{-2}	5.624×10^{-4}
1.778	6.646×10^{-3}	2.361×10^{-4}
1.998	2.663×10^{-3}	1.128×10^{-4}
2.218	1.055×10^{-3}	5.819×10^{-5}
2.444	4.297×10^{-4}	3.287×10^{-5}
2.670	1.547×10^{-4}	1.806×10^{-5}
2.872	8.473×10^{-5}	1.262×10^{-5}
3.099	4.329×10^{-5}	8.573×10^{-6}
3.351	9.573×10^{-6}	3.820×10^{-6}
3.763	2.026×10^{-6}	1.078×10^{-6}

Incident Proton Momentum = 250 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.454	5.033×10^{0}	2.150×10^{-1}
0.675	1.309×10^{0}	6.354×10^{-2}
0.907	3.837×10^{-1}	1.802×10^{-2}
1.112	1.364×10^{-1}	5.978×10^{-3}
1.336	4.731×10^{-2}	2.425×10^{-3}
1.555	1.665×10^{-2}	6.840×10^{-4}
1.776	6.688×10^{-3}	2.946×10^{-4}
1.994	2.633×10^{-3}	1.323×10^{-4}
2.216	1.082×10^{-3}	6.701×10^{-5}
2.432	4.473×10^{-4}	3.652×10^{-5}
2.662	1.867×10^{-4}	2.125×10^{-5}
2.868	7.456×10^{-5}	1.236×10^{-5}
3.107	3.385×10^{-5}	7.822×10^{-6}
3.316	2.179×10^{-5}	5.921×10^{-6}
3.792	5.681×10^{-6}	1.618×10^{-6}

Laboratory Angle = 200 Milliradians

Incident Proton Momentum = 275 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.450	5.171×10^{0}	4.440×10^{-1}
0.669	1.484×10^{0}	1.469×10^{-1}
0.905	3.896×10^{-1}	3.791×10^{-2}
1.116	1.249×10^{-1}	1.162×10^{-2}
1.333	3.693×10^{-2}	4.326×10^{-3}
1.552	1.616×10^{-2}	1.351×10^{-3}
1.774	6.954×10^{-3}	6.308×10^{-4}
1.985	2.509×10^{-3}	2.698×10^{-4}
2.226	9.955×10^{-4}	1.407×10^{-4}
2.443	3.609×10^{-4}	7.246×10^{-5}
2.666	1.966×10^{-4}	4.954×10^{-5}
2.893	8.167×10^{-5}	2.957×10^{-5}
3.094	3.593×10^{-5}	1.825×10^{-5}
3.304	3.857×10^{-5}	1.789×10^{-5}
3.777	3.552×10^{-6}	4.763×10^{-6}
4.369	3.623×10^{-6}	2.940×10^{-6}

Laboratory Angle = 275 Milliradians

Incident Proton Momentum = 50 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.728×10^{0}	1.676×10^{-1}
0.728	6.893×10^{-1}	7.040×10^{-2}
0.682	2.965×10^{-1}	3.410×10^{-2}
1.037	1.171×10^{-1}	1.701×10^{-2}
1.191	4.990×10^{-2}	4.853×10^{-3}
1.346	2.325×10^{-2}	2.510×10^{-3}
1.500	7.523×10^{-3}	1.065×10^{-3}
1.655	4.546×10^{-3}	7.705×10^{-4}
1.809	2.245×10^{-3}	2.391×10^{-4}
1.964	8.461×10^{-4}	1.073×10^{-4}

Incident Proton Momentum = 75 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.634×10^{0}	1.290×10^{-1}
0.728	6.041×10^{-1}	5.182×10^{-2}
0.882	2.691×10^{-1}	2.647×10^{-2}
1.037	1.298×10^{-1}	1.543×10^{-2}
1.191	4.860×10^{-2}	3.909×10^{-3}
1.346	2.014×10^{-2}	1.850×10^{-3}
1.500	1.006×10^{-2}	1.089×10^{-3}
1.655	4.238×10^{-3}	6.062×10^{-4}
1.809	2.107×10^{-3}	1.814×10^{-4}
1.964	1.186×10^{-3}	1.134×10^{-4}
2.118	4.712×10^{-4}	5.608×10^{-5}

Incident Proton Momentum = 100 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.996×10^{0}	1.523×10^{-1}
0.728	7.734×10^{-1}	6.433×10^{-2}
0.882	3.747×10^{-1}	3.528×10^{-2}
1.037	1.648×10^{-1}	1.930×10^{-2}
1.191	7.018×10^{-2}	5.460×10^{-3}
1.346	3.019×10^{-2}	2.645×10^{-3}
1.500	1.619×10^{-2}	1.628×10^{-3}
1.655	5.936×10^{-3}	8.174×10^{-4}
1.809	3.153×10^{-3}	2.565×10^{-4}
1.964	1.623×10^{-3}	1.473×10^{-4}
2.118	7.588×10^{-4}	8.233×10^{-5}
2.273	3.907×10^{-4}	5.202×10^{-5}

Incident Proton Momentum = 125 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.871×10^{0}	1.407×10^{-1}
0.728	7.742×10^{-1}	6.359×10^{-2}
0.882	3.409×10^{-1}	3.252×10^{-2}
1.037	1.407×10^{-1}	1.723×10^{-2}
1.191	6.097×10^{-2}	4.765×10^{-3}
1.346	2.924×10^{-2}	2.545×10^{-3}
1.500	1.345×10^{-2}	1.398×10^{-3}
1.655	6.380×10^{-3}	8.373×10^{-4}
1.809	3.414×10^{-3}	2.687×10^{-4}
1.964	1.537×10^{-3}	1.367×10^{-4}
2.118	8.145×10^{-4}	8.352×10^{-5}
2.273	4.087×10^{-4}	5.130×10^{-5}
2.427	1.984×10^{-4}	3.217×10^{-5}

Incident Proton Momentum = 150 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.863×10^{0}	6.600×10^{-2}
0.728	7.353×10^{-1}	2.835×10^{-2}
0.862	2.924×10^{-1}	1.340×10^{-2}
1.037	1.473×10^{-1}	8.184×10^{-3}
1.191	6.171×10^{-2}	2.198×10^{-3}
1.346	2.845×10^{-2}	1.137×10^{-3}
1.500	1.467×10^{-2}	6.822×10^{-4}
1.655	7.221×10^{-3}	4.169×10^{-4}
1.809	3.240×10^{-3}	1.193×10^{-4}
1.964	1.615×10^{-3}	6.695×10^{-5}
2.118	8.330×10^{-4}	4.028×10^{-5}
2.273	4.274×10^{-4}	2.512×10^{-5}
2.427	2.404×10^{-4}	1.720×10^{-5}
2.582	1.180×10^{-4}	1.103×10^{-5}

Laboratory Angle = 275 Milliradians

Incident Proton Momentum = 175 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.552×10^{0}	7.073×10^{-2}
0.728	7.488×10^{-1}	3.099×10^{-2}
0.882	3.180×10^{-1}	1.524×10^{-2}
1.037	1.293×10^{-1}	7.921×10^{-3}
1.191	6.194×10^{-2}	2.419×10^{-3}
1.346	2.984×10^{-2}	1.246×10^{-3}
1.500	1.293×10^{-2}	6.632×10^{-4}
1.655	5.834×10^{-3}	3.805×10^{-4}
1.809	3.326×10^{-3}	1.317×10^{-4}
1.964	1.587×10^{-3}	6.972×10^{-5}
2.118	8.557×10^{-4}	4.263×10^{-5}
2.273	4.501×10^{-4}	2.658×10^{-5}
2.427	2.343×10^{-4}	1.707×10^{-5}
2.582	1.276×10^{-4}	1.160×10^{-5}

Incident Proton Momentum = 225 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.894×10^{0}	7.466×10^{-2}
0.728	7.607×10^{-1}	3.270×10^{-2}
0.882	3.338×10^{-1}	1.660×10^{-2}
1.037	1.412×10^{-1}	8.899×10^{-3}
1.191	6.513×10^{-2}	2.630×10^{-3}
1.346	3.014×10^{-2}	1.351×10^{-3}
1.500	1.344×10^{-2}	7.188×10^{-4}
1.655	6.798×10^{-3}	4.456×10^{-4}
1.809	3.510×10^{-3}	1.434×10^{-4}
1.964	1.740×10^{-3}	7.835×10^{-5}
2.118	9.553×10^{-4}	4.854×10^{-5}
2.273	5.086×10^{-4}	3.045×10^{-5}
2.427	2.577×10^{-4}	1.918×10^{-5}
2.582	1.283×10^{-4}	1.235×10^{-5}

Incident Proton Momentum = 200 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.925×10^{0}	7.295×10^{-2}
0.728	8.453×10^{-1}	3.453×10^{-2}
0.882	3.407×10^{-1}	1.640×10^{-2}
1.037	1.584×10^{-1}	9.413×10^{-3}
1.191	6.908×10^{-2}	2.654×10^{-3}
1.346	3.174×10^{-2}	1.360×10^{-3}
1.500	1.541×10^{-2}	7.752×10^{-4}
1.655	7.273×10^{-3}	4.594×10^{-4}
1.809	3.680×10^{-3}	1.441×10^{-4}
1.964	2.000×10^{-3}	8.580×10^{-5}
2.118	1.018×10^{-3}	5.027×10^{-5}
2.273	5.240×10^{-4}	3.101×10^{-5}
2.427	2.588×10^{-4}	1.937×10^{-5}
2.582	1.368×10^{-4}	1.302×10^{-5}

Incident Proton Momentum = 250 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.962×10^{0}	7.722×10^{-2}
0.728	7.977×10^{-1}	3.432×10^{-2}
0.882	3.459×10^{-1}	1.734×10^{-2}
1.037	1.529×10^{-1}	9.614×10^{-3}
1.191	7.104×10^{-2}	2.859×10^{-3}
1.346	3.265×10^{-2}	1.460×10^{-3}
1.500	1.568×10^{-2}	3.211×10^{-4}
1.655	8.475×10^{-3}	5.291×10^{-4}
1.809	3.768×10^{-3}	1.533×10^{-4}
1.964	2.032×10^{-3}	8.995×10^{-5}
2.118	1.074×10^{-3}	5.389×10^{-5}
2.273	5.575×10^{-4}	3.317×10^{-5}
2.427	2.786×10^{-4}	2.075×10^{-5}
2.582	1.723×10^{-4}	1.525×10^{-5}
2.736	8.758×10^{-5}	1.013×10^{-5}

Laboratory Angle = 275 Milliradians

Incident Proton Momentum = 275 GeV/c		
$p_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	1.810×10^{0}	7.541×10^{-2}
0.728	7.424×10^{-1}	3.373×10^{-2}
0.882	3.208×10^{-1}	1.695×10^{-2}
1.037	1.525×10^{-1}	9.855×10^{-3}
1.191	6.128×10^{-2}	2.612×10^{-3}
1.346	2.983×10^{-2}	1.403×10^{-3}
1.500	1.393×10^{-2}	7.694×10^{-4}
1.655	7.428×10^{-3}	4.944×10^{-4}
1.809	3.405×10^{-3}	1.462×10^{-4}
1.964	1.892×10^{-3}	8.820×10^{-5}
2.118	9.331×10^{-4}	5.001×10^{-5}
2.273	4.813×10^{-4}	3.071×10^{-5}
2.427	2.878×10^{-4}	2.155×10^{-5}
2.582	1.481×10^{-4}	1.402×10^{-5}
2.736	1.121×10^{-4}	1.171×10^{-5}

Incident Proton Momentum = 300 GeV/c		
$P_\perp$ (GeV/c)	$Ed\sigma/dp^3$	± Error
0.573	2.092×10^{0}	1.707×10^{-1}
0.728	8.931×10^{-1}	7.972×10^{-2}
0.882	3.566×10^{-1}	3.810×10^{-2}
1.037	1.645×10^{-1}	2.201×10^{-2}
1.191	8.156×10^{-2}	6.778×10^{-3}
1.346	3.760×10^{-2}	3.480×10^{-3}
1.500	2.169×10^{-2}	2.247×10^{-3}
1.655	9.503×10^{-3}	1.246×10^{-3}
1.809	4.569×10^{-3}	3.813×10^{-4}
1.964	2.405×10^{-3}	2.191×10^{-4}
2.118	1.229×10^{-3}	1.278×10^{-4}
2.273	7.314×10^{-4}	8.693×10^{-5}
2.427	4.721×10^{-4}	6.394×10^{-5}
2.582	2.169×10^{-4}	3.866×10^{-5}
2.736	9.295×10^{-5}	2.330×10^{-5}

Figure Captions

Fig. 1: Typical layout of the experimental apparatus.

Fig. 2: Basic elements of the hydrogen jet and rotating targets used in the experiment.

Fig. 3: Plan view of the detectors and surrounding shielding.

Fig. 4: Typical histogram of events in the monitor telescope as a function of the product of the pulse heights in the thick and thin scintillators. The large peak is due to protons, the others to deuterons and tritons.

Fig. 5: Typical histogram of events in the solid-state detector as a function of pulse height.

Fig. 6: Block diagram of the basic elements of the electronic logic system.

Fig. 7: Typical histogram of events in counter #2 making a γ trigger, as a function of pulse height.

Fig. 8: γ trigger rate as a function of position of the steel slit.

Fig. 9: Typical histogram as a function of pulse height in the lead-glass counter for events satisfying a "muon" trigger.

Fig. 10: π^0 invariant cross sections as a function of transverse momentum for various incident proton beam momenta, at laboratory angles (a) 30 mrad, (b) 65 mrad, (c) 100 mrad, and (d) 200 mrad.

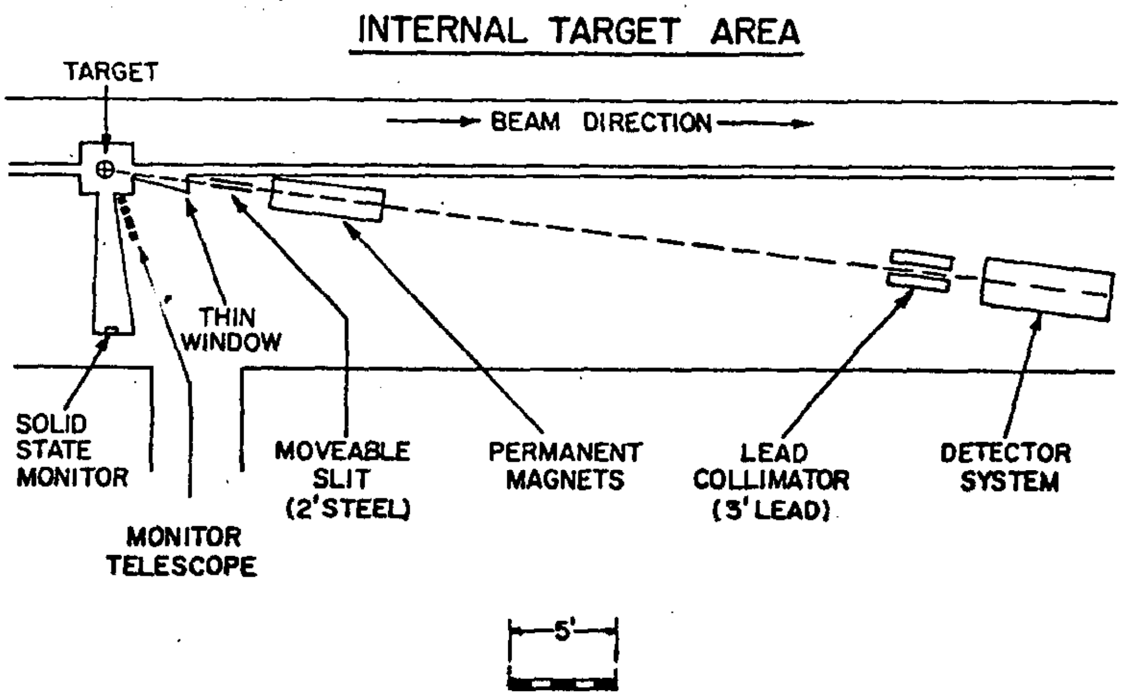

INTERNAL TARGET AREA
TARGET
BEAM DIRECTION
THIN WINDOW
SOLID STATE MONITOR
MONITOR TELESCOPE
MOVEABLE SLIT (2' STEEL)
PERMANENT MAGNETS
LEAD COLLIMATOR (3' LEAD)
DETECTOR SYSTEM
5'

Figure 1

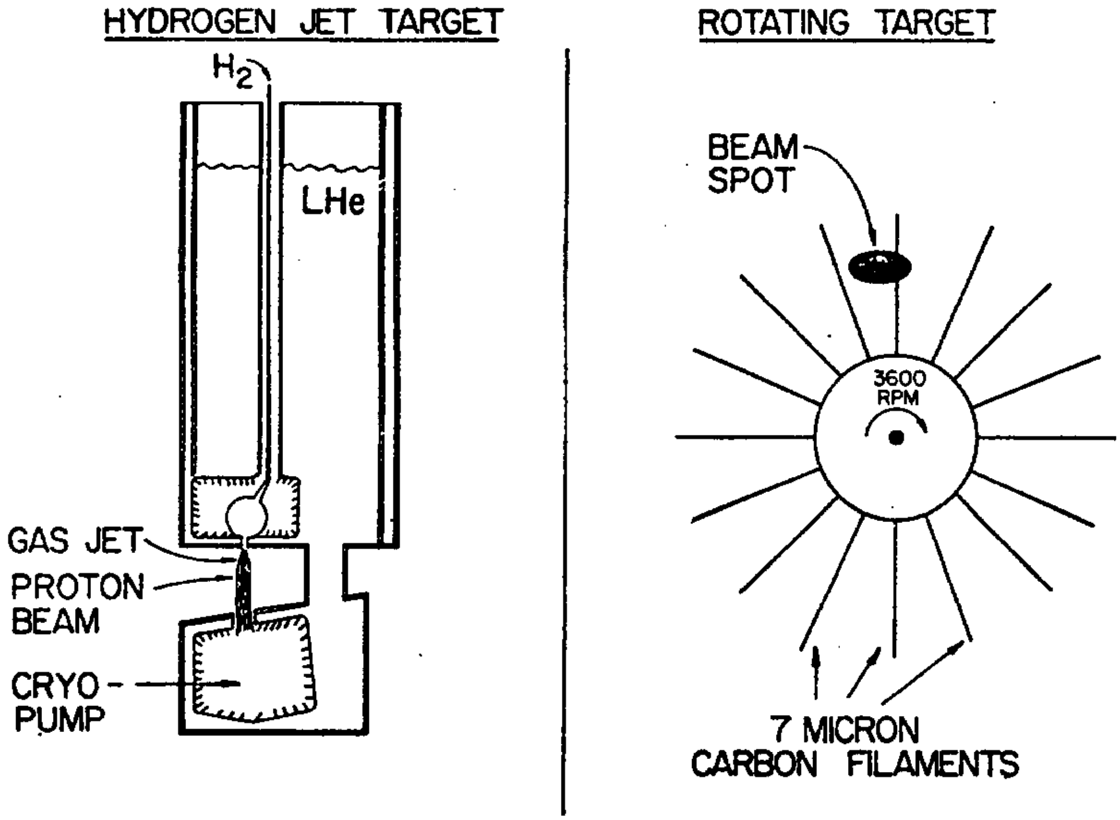

HYDROGEN JET TARGET
H_2
LHe
GAS JET
PROTON BEAM
CRYO - PUMP
ROTATING TARGET
BEAM SPOT
3600 RPM
7 MICRON CARBON FILAMENTS

Figure 2

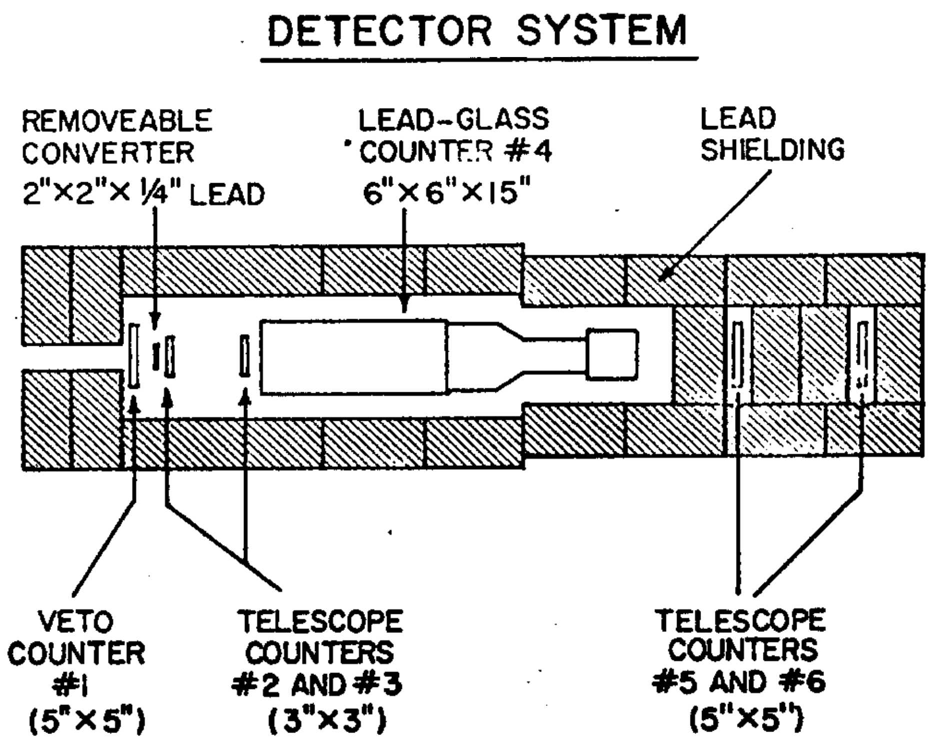

DETECTOR SYSTEM
REMOVEABLE CONVERTER 2"×2"× 1/4" LEAD
LEAD-GLASS COUNTER #4 6"×6"×15"
LEAD SHIELDING
VETO COUNTER #1 (5"×5")
TELESCOPE COUNTERS #2 AND #3 (3"×3")
TELESCOPE COUNTERS #5 AND #6 (5"×5")

Figure 3

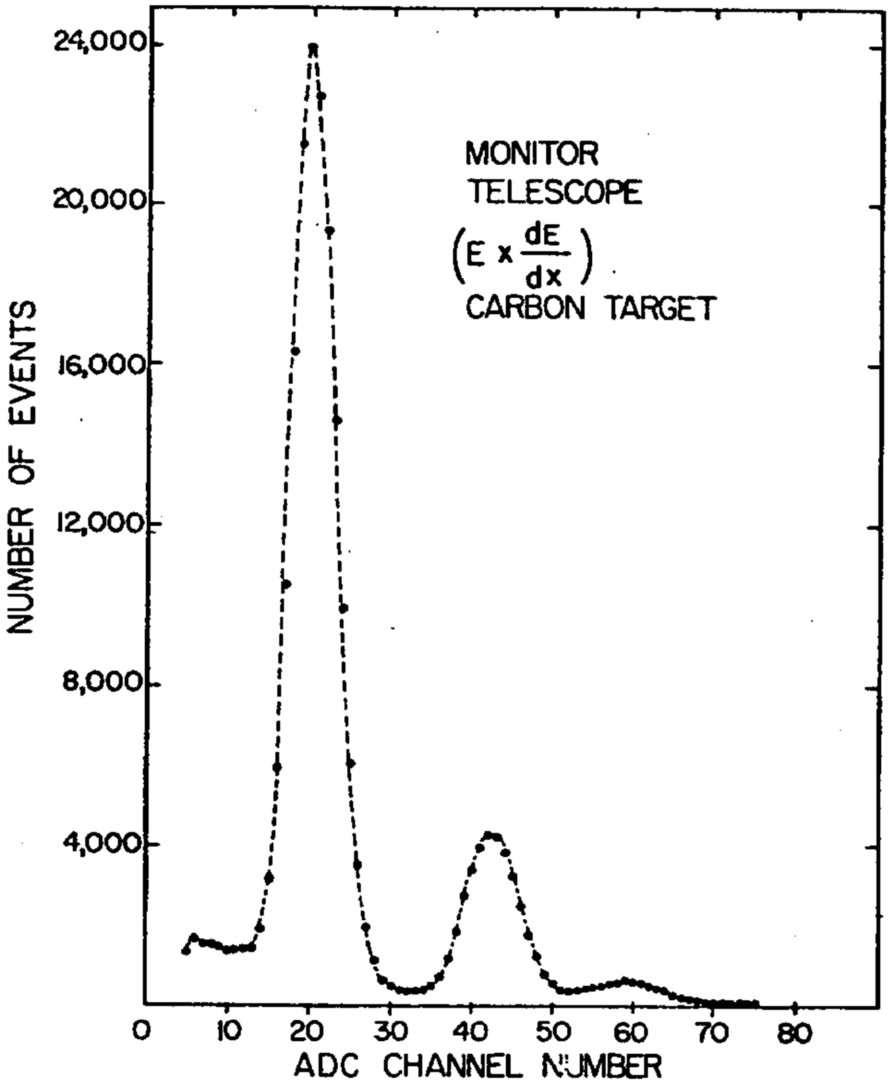

MONITOR
TELESCOPE
$\left(E \times \frac{dE}{dx}\right)$
CARBON TARGET
NUMBER OF EVENTS
24,000
20,000
16,000
12,000
8,000
4,000
0
10
20
30
40
50
60
70
80
ADC CHANNEL NUMBER

Figure 4

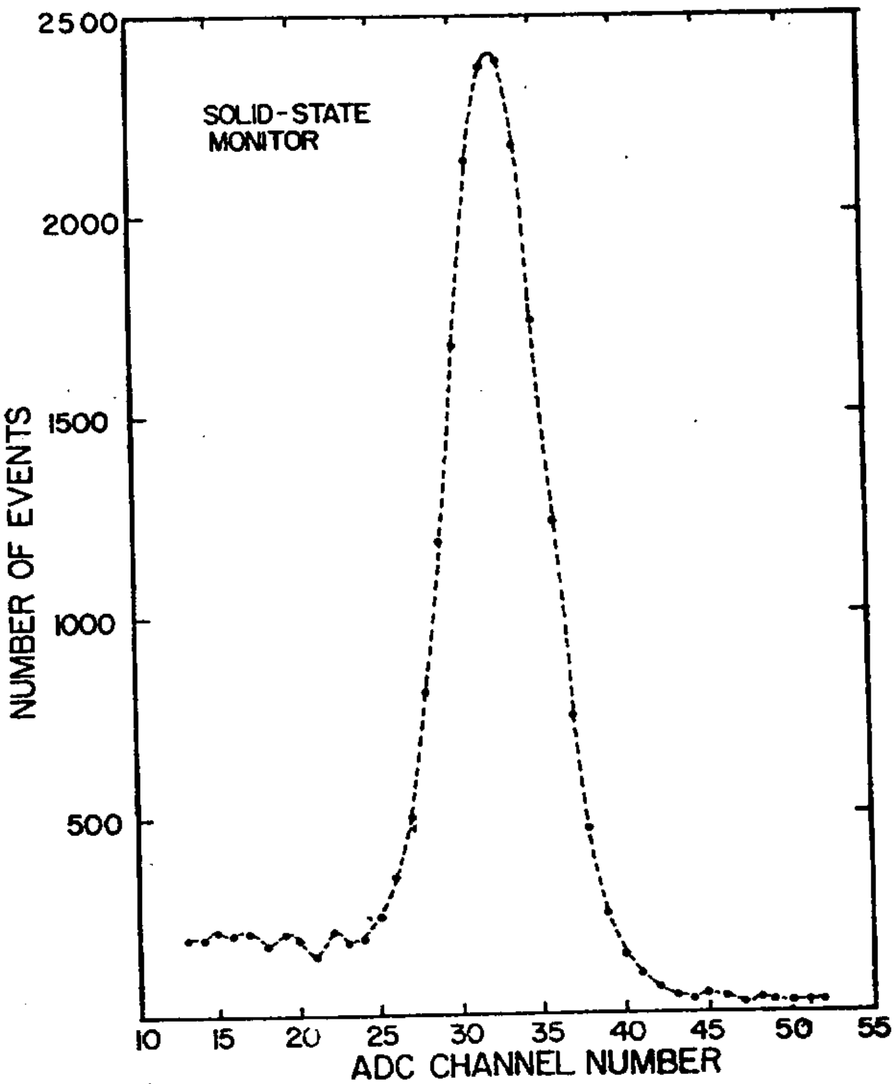
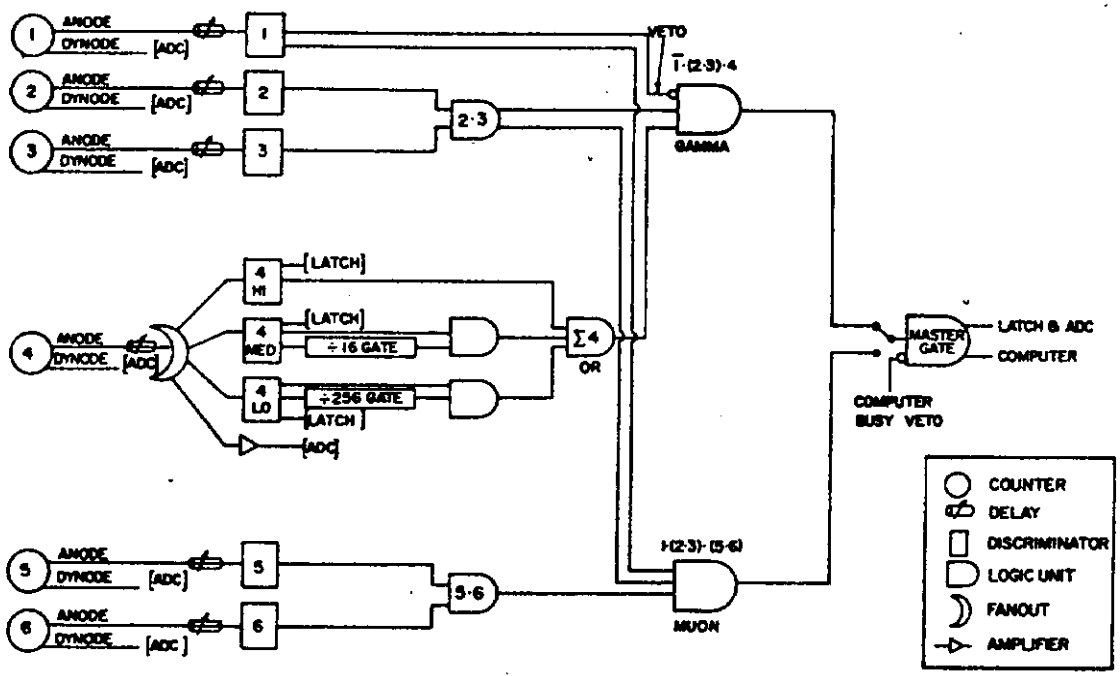
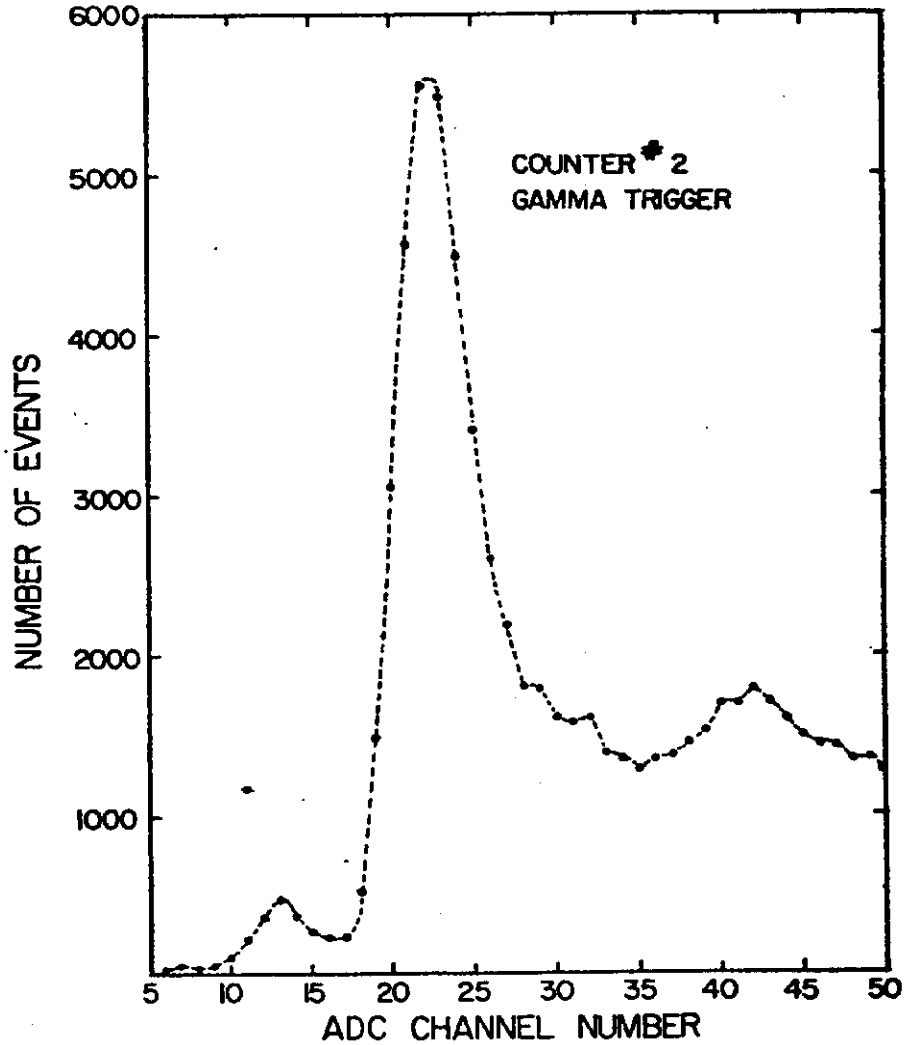

2500
2000
1500
1000
500
NUMBER OF EVENTS
SOLID-STATE
MONITOR
10
15
20
25
30
35
40
45
50
55
ADC CHANNEL NUMBER

Figure 5



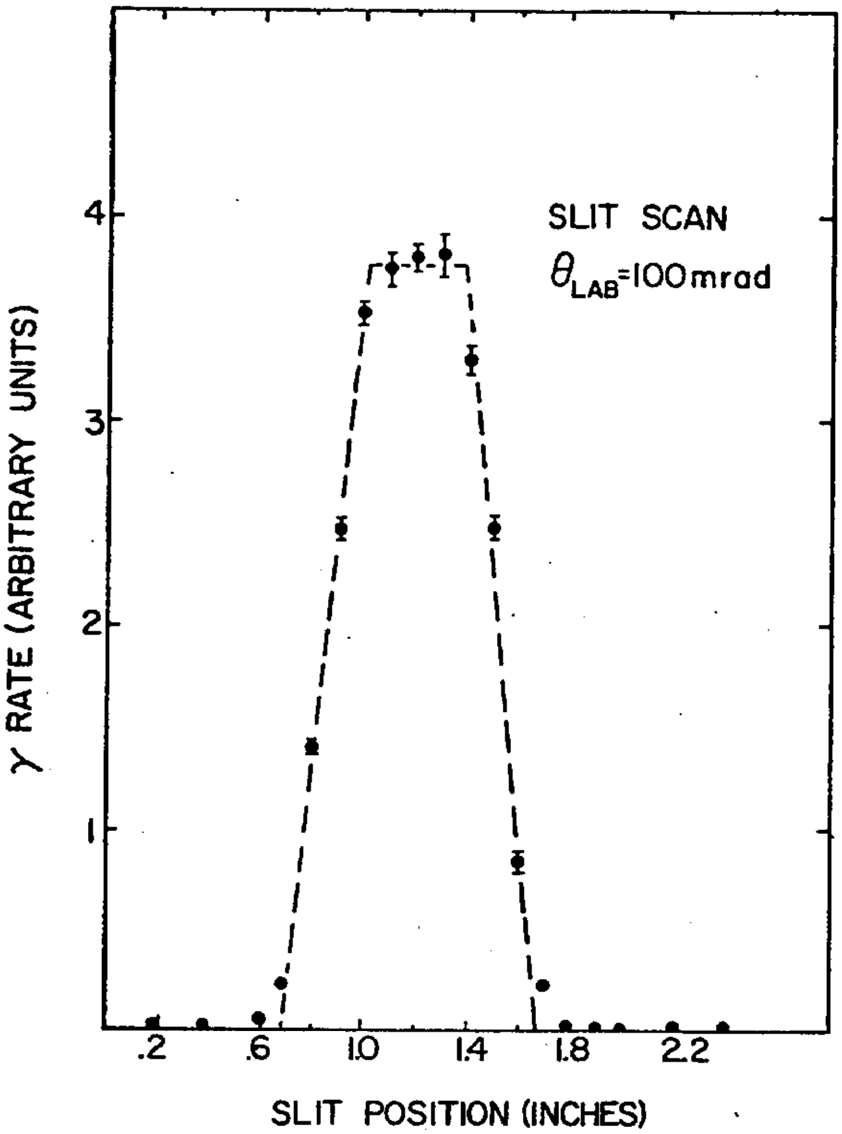
ANODE
DYNODE
[ADC]
VETO
$\overline{1}\cdot(2\cdot3)\cdot4$
2·3
GAMMA
[LATCH]
4 HI
4 MED
÷16 GATE
4 LO
÷256 GATE
$\Sigma 4$
OR
MASTER GATE
LATCH & ADC
COMPUTER
COMPUTER BUSY VETO
5·6
$1\cdot(2\cdot3)\cdot(5\cdot6)$
MUON
COUNTER
DELAY
DISCRIMINATOR
LOGIC UNIT
FANOUT
AMPLIFIER

Figure 6



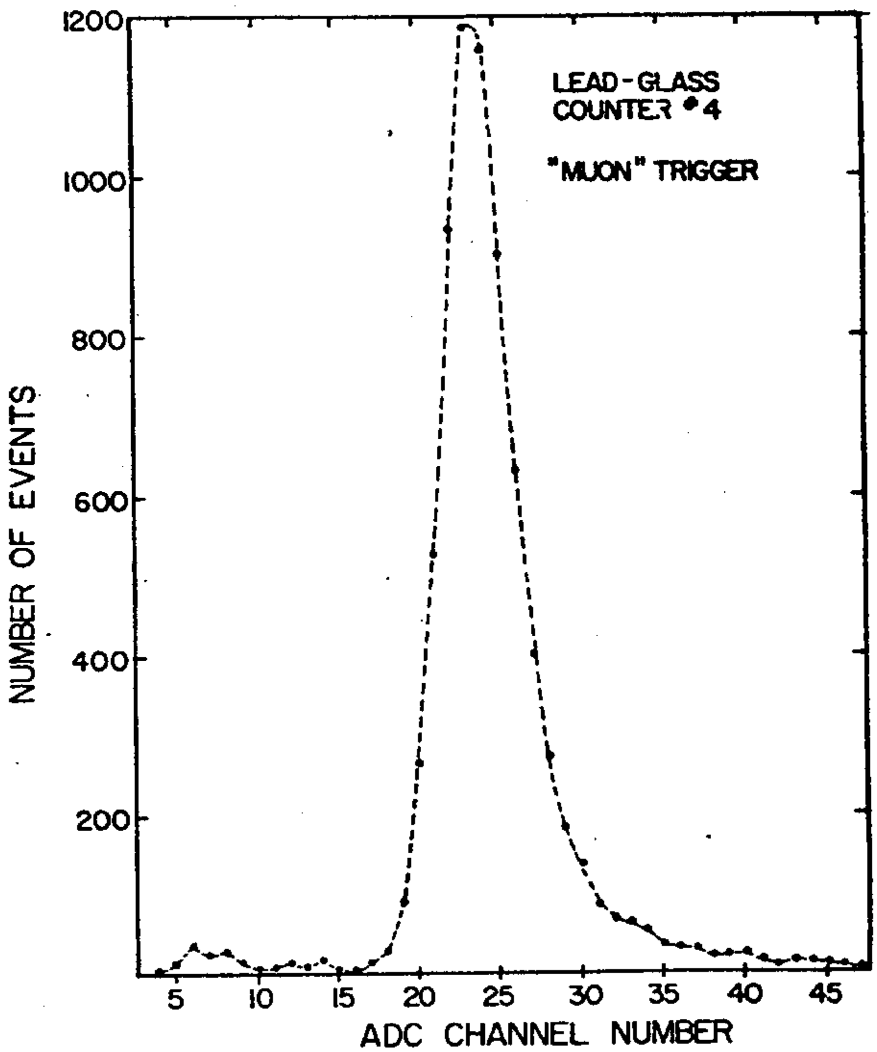
6000
5000
4000
3000
2000
1000
NUMBER OF EVENTS
COUNTER # 2
GAMMA TRIGGER
5
10
15
20
25
30
35
40
45
50
ADC CHANNEL NUMBER

Figure 7



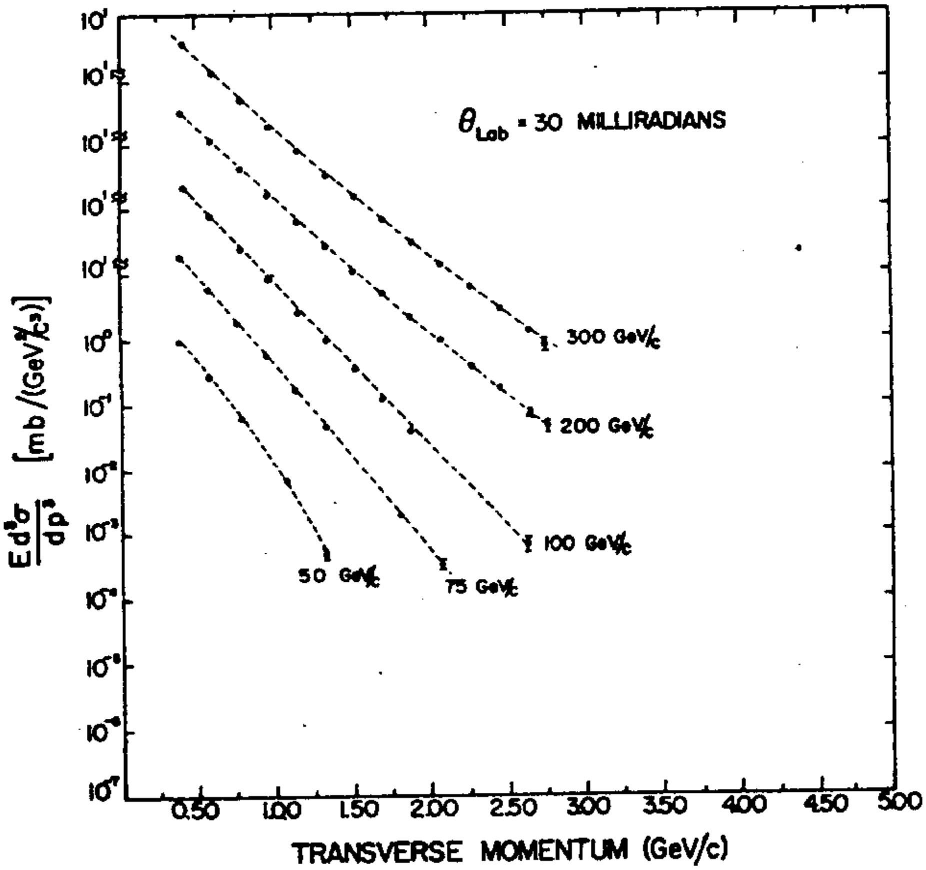
SLIT SCAN
θ_{LAB}=100mrad
γ RATE (ARBITRARY UNITS)
4
3
2
1
.2
.6
1.0
1.4
1.8
2.2
SLIT POSITION (INCHES)

Figure 8



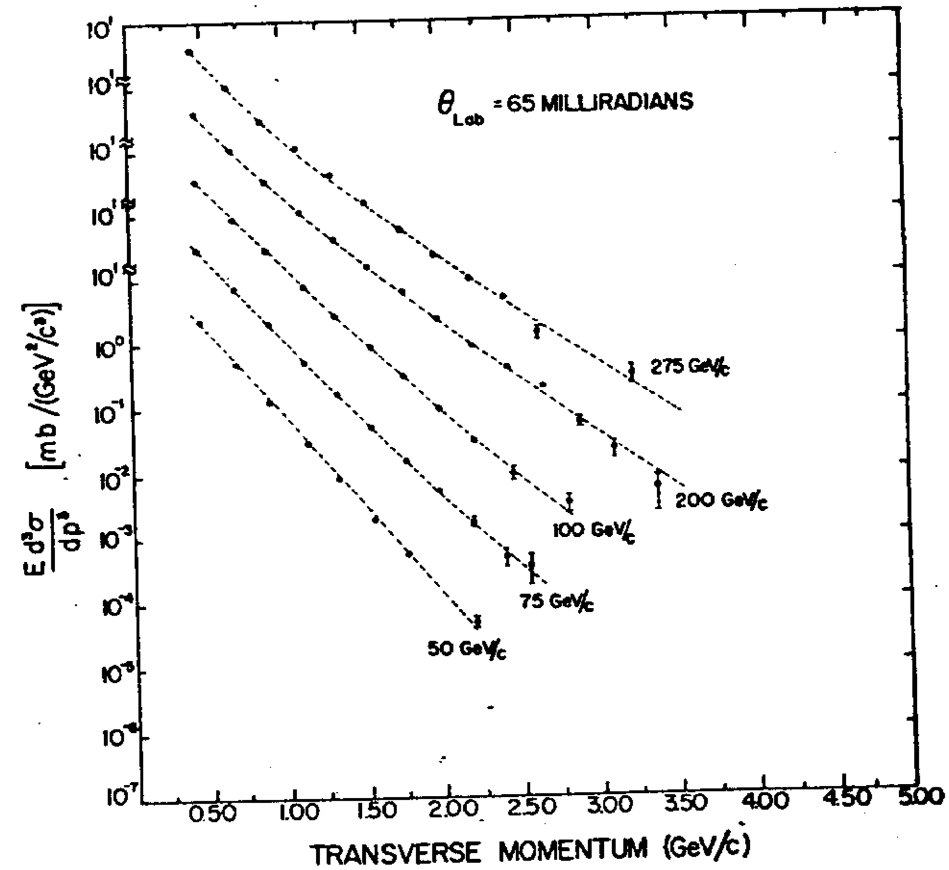
LEAD-GLASS
COUNTER #4
"MUON" TRIGGER
NUMBER OF EVENTS
1200
1000
800
600
400
200
5
10
15
20
25
30
35
40
45
ADC CHANNEL NUMBER

Figure 9



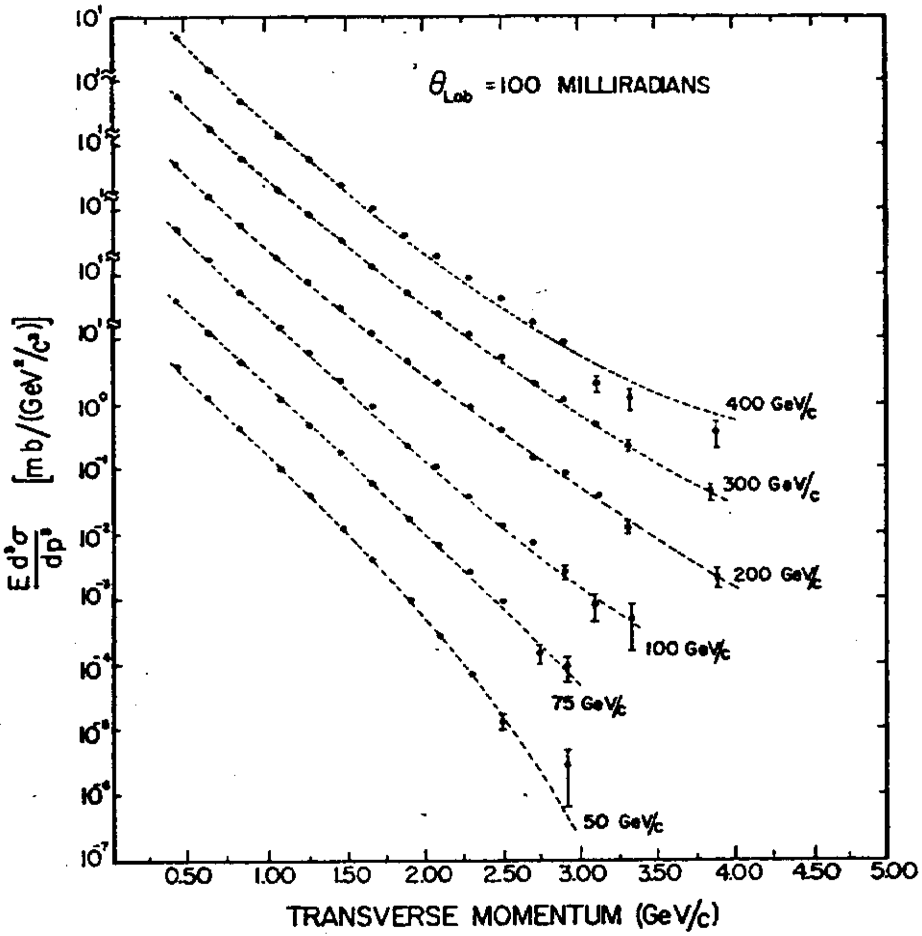
θ_{Lab} = 30 MILLIRADIANS
300 GeV/c
200 GeV/c
100 GeV/c
75 GeV/c
50 GeV/c
$\frac{E d^3\sigma}{dp^3}$ [mb/(GeV²/c³)]
TRANSVERSE MOMENTUM (GeV/c)
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00

Figure 10a



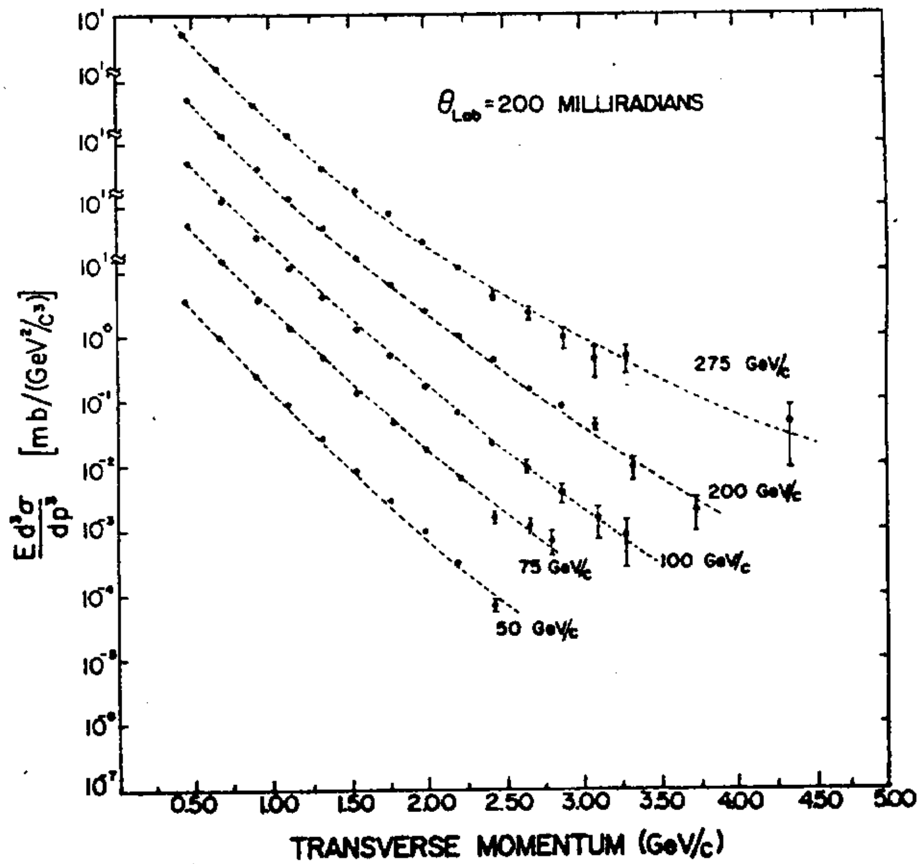
θ_{Lab} = 65 MILLIRADIANS
275 GeV/c
200 GeV/c
100 GeV/c
75 GeV/c
50 GeV/c
$E\frac{d^3\sigma}{dp^3}$ [mb/(GeV^2/c^3)]
TRANSVERSE MOMENTUM (GeV/c)
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00

Figure 10b.



θ_{Lab} = 100 MILLIRADIANS
400 GeV/c
300 GeV/c
200 GeV/c
100 GeV/c
75 GeV/c
50 GeV/c
TRANSVERSE MOMENTUM (GeV/c)
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00

Figure 10c



θ_{Lab} = 200 MILLIRADIANS
275 GeV/c
200 GeV/c
100 GeV/c
75 GeV/c
50 GeV/c
$\frac{Ed^3\sigma}{dp^3}$ [mb/(GeV²/c³)]
TRANSVERSE MOMENTUM (GeV/c)

Figure 10d