### MUON PRODUCTION IN A NEUTRINO BEAM DUMP

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### Abstract

We propose an instrumented beam dump for the neutrino area in the Tevatron era with which we will make the following measurements with the highest sensitivity possible: 1 - high  $p_T$  dimu production, 2 - the full kinematic range ( $\cos\theta^{\star}$ ,  $x_F$  and  $p_T$ ) of high mass Drell-Yan production, 3 - electro-weak interference in dimu production, 4 - very high  $p_T$  single muon production, 5 - multi  $\mu$  ( $n_{\mu} \ge 3$ ) production, and 6 - mu-neutrino correlations if their feasibility is established.

### I. INTRODUCTION

E-439 was a beam dump experiment using magnetized iron (bending in one plane), Cerenkov hodoscope counters (with a wave length shifter) in rectangular x-y arrays for triggering and defining the "roads" for track searches, and multiple wire proportional chambers for track measurements. The experiment ran very well at intensities of 5 x  $10^{11}$  protons/1 second spill (equivalent to  $10^{13}$  protons/20 second spill) so it is clear that a second generation experiment of that type could run at the maximum slow beam spill now being contemplated for the Tevatron.

The first experiment proposed by the original E-439 group as a successor to E-439 was P-583, a study of the asymmetry in the  $\cos^{*}$  distribution of (Drell-Yan) dimu production due to interference between the  $\gamma$  and the Z<sup>o</sup>. The proposal was rejected twice in 1978, and the main author of the proposal, John Rutherfoord, has since joined E-605 and he expects to measure the  $\gamma$ -Z<sup>o</sup> interference in that experiment. For reasons we develop in Section IV below, we believe that an updated version of the experiment proposed in P-583 and using 800 GeV protons, should be approved for the contemplated beam dump in the neutrino area.

The second successor to E-439 was P-618. Originally P-618 suggested setting up a beam dump in front of Lab E; however, due to lack of interest on the part of both the laboratory and the neutrino experimenters, a modified version of the proposal was submitted which asked for modification of the M2 line beam dump contemplated for E-613, to allow measurements of inclusive single mu and dimu production at very high  $p_T$ , very high mass dimu production, and studies of mu-neutrino correlations. The measurements were to be done parasitically in the course of running E-613. That proposal was also rejected.

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This proposal is a recasting of P-618 and P-583 in terms of a Tevatron neutrino beam dump. We assume that a beam dump will be built to do prompt neutrino physics, and we suggest that the cost of 800 GeV protons is so high and their availability so rare that an effort should be made to study the muons produced in the dump as effectively as possible. We think that the physics proposed here is so attractive that it may be considered to add appreciably to the value of the dump. And the most suitable type of

dump is the E-439 type, symmetric in x and y and with bending in one plane only. The apparatus we propose is a modified version of the P-583 apparatus; most of the experiments we propose do not require the <u>full</u> kinematic acceptance needed for the asymmetry measurement, but we think it would be a mistake not to build an apparatus with the largest possible acceptance.

The easiest experiment to do is the measurement of high  $p_T$  dimu production (Section II, below), and we give it first priority. In Section III we discuss the full range of Drell-Yan studies, and in Section IV we discuss the most demanding measurement of all, electro-weak interference. In Section V we discuss single  $\mu$  production and in Section VI we discuss multi mu production, which we expect to do in conjunction with <u>normal</u> neutrino running, using a low intensity proton beam. We defer the discussion of  $\mu$ - $\nu$  correlations. We assume throughout that the full (i.e., the one needed for the asymmetry measurement) apparatus will be available. In Section VII we discuss the detector and in Section VIII the budget.

We are also appending a volume which contains 4 sets of documents. 1 - Two E-439 reports.

2 - Two reports by John Rutherfoord (one with Sam Childress).

3 - P-618 documents.

4 - P-583 documents.

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### II. HIGH PT DIMU PRODUCTION

Most of the discussion in this section refers to dimu production in the mass region between (and including) the  $\psi$  and T families. Since our apparatus is a scaled version of the one in P-583 we assume that we can detect about 1/4 of all the dimus produced with a combined mass and  $p_T$  above 12 GeV (cf., the discussion in the addendum to P-583 of May 18, 1978, pp. 17-20).

To understand what our sensitivity will be we use the following considerations:

1 - Minimal neutrino experiment  $\sim 10^{17}$  protons on target 2 - Scaling:  $s \frac{d^2 \sigma}{d/\tau dy} \bigg|_{\tau=0} = 44 e^{-25 \cdot 3/\tau} \mu b$ 3 -  $\langle p_{\tau} \rangle$  = (.028/s + .37) GeV  $4 - \frac{d^2\sigma}{dMdy} \sim \frac{d\sigma}{dM}$ 5 -  $\frac{dN(\mu^{+}\mu^{-})}{dMdp_{\pi}} = \frac{1}{4} \frac{d^{2}\sigma}{dMdp_{\pi}} * \frac{N_{\text{protons}}}{\sigma_{\text{total pp}}}$ 6 - (factoring out  $p_T$  dependence)  $\frac{d^2\sigma}{dMdp_T} = \frac{d\sigma}{dM} \frac{1}{\langle p_T \rangle} e^{-p_T^2/\langle p_T^2 \rangle}$ putting in  $\sqrt{s} = 38.8$  GeV  $\frac{d^2\sigma}{dMdp_{-}} \sim .8 e^{-.65M-.69p_{T}} \mu b/GeV^2$ and using  $\sigma_{pp \text{ total}} = 50 \text{ mb}$ , N =  $10^{17}$  $\frac{dN(\mu\mu)}{dMdp_{m}} \sim 2 \times 10^{11} \times e^{-.66(M+p_{T})}/GeV^{2}$ for  $M + p_T = 12$ , 18 GeV we would have 73 x 10<sup>6</sup>, 1.4 x 10<sup>6</sup> events respectively. We are clearly not limited in sensitivity, and

a factor of two in our acceptance estimate is irrelevant.

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We suggest the following reasons for doing these measurements: 1 - High p<sub>T</sub> continuum (γ) dimu production probes the gluon structure functions "directly."

- 2 The spin of the gluon should affect the polarization of the  $\gamma \sim a$  very heavy  $\gamma$  may have an appreciable (i.e., a few percent) cos2 $\beta$  dependence on the angle  $\beta$  between the scattering plane and the dimu plane. At high  $p_T$  and high mass our  $\beta$  azimuthal acceptance is excellent. Since our scattering plane has a large  $\phi$  range, biases due to systematic errors can easily be rid of.
- 3 High  $p_T$  resonance production may shed light on the resonance production process. We especially are interested in looking for bumps in the  $p_T$  distribution indicative of two body decays of a very heavy particle (e.g.,  $H \rightarrow J/\psi + B$ ,  $H \rightarrow T + \gamma$ , etc.).
- 4 At very high mass and high  $p_T$  there may be an anomalous rise in the cross section.
- 5 The unknown, the unpredicted may be waiting to be discovered at the extremes of  $p_T$  and  $q^2$  in an experiment as sensitive as this one.

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### III. DRELL-YAN DIMU PRODUCTION

E-439 was very successful in probing the  $x_F$  and  $p_T$  distributions in continuum dimu production and comparing them with the Drell-Yan model. As has been pointed out by John Rutherfoord (rf: addendum to proposal 583, October 13, 1978, pp. 16-19), the best way to study scale breaking in the quark sea distributions is to measure  $x_F$  distributions over a wide range of  $x_F$  and  $q^2$  (i.e.,  $M^2$ ), since at  $x_F = 0$ ,  $q^2 = x^2s$  and a  $q^2$  dependence can be disguised as an x dependence. In spite of our high statistics in E-439 (225,000 dimus above 6 GeV) our geometrical acceptance was almost triangular rather than flat and our data were not adequate to measure the scale breaking terms in the sea distribution. In the experiment proposed here the  $x_F$ acceptance is essentially flat in the positive  $x_F$  region, and we will have much better statistics over a much wider range of  $q^2$  and  $x_F$ .

We will also be able to study in detail the relationship of  $x_F$  to  $p_T$  distributions, the relationship of  $q^2$  and  $p_T$  to the angular distribution  $(\cos\theta^*)$  and whatever else is interesting in this field. We propose the world's most sensitive dimu probe at the highest energy and over a very wide kinematic range (-.2  $\leq x_F \leq 1$ ,  $p_T \leq ?$ ,  $q \leq 35$  GeV, -.8  $\leq \cos\theta^* \leq .8$ ) and we expect it to yield very interesting results for a long time.

We will not discuss the basic importance of these measurements but only make the following points:

- 1 The e<sup>+</sup>e<sup>-</sup> colliders do not presently have the luminosity to measure the  $\sqrt{-Z^{0}}$  interference.
- 2 E-605 has certain advantages over this proposal:
  - a It is an approved experiment.
  - b It uses  $\pi$  beams, where the effect is larger and easier to interpret.
  - c It has John Rutherfoord, the designer of P-583 committed
     to working on it.

3 - E-605 has certain disadvantages compared to this proposal:

- a The angular acceptance is much smaller in E-605 and the asymmetry is directly proportional to the range of  $\cos \theta^{\star}$ .
- b The acceptance of E-605 is more than an order of magnitude lower than ours.
- c The possibility of trouble from halo muons and low energy neutrons in E-605.
- d The number of protons on target available for these measurements is going to be severely restricted in E-605 for various reasons - both internal, because of other aims of E-605, and external, because of competition due to other users, whereas we will take the bulk of the protons on target dedicated to prompt neutrino physics.
- 4 All the experiments complement each other.

As an aside, we mention the possibility that the committee may wish to make the prompt neutrino line a high acceptance line capable of transmitting an intense pion beam. In that case the apparatus can be used for pion Drell-Yan physics as well, including the asymmetry measurement. There is no advantage in E-605's high resolution when doing the asymmetry measurement.

### V. <u>VERY HIGH P<sub>T</sub> SINGLE MU PRODUCTION</u>

We place less emphasis on these measurements since here we are competing with E-605 but we do have an extremely wide angle detector with large acceptance sitting behind a target bombarded with an enormous number of the world's highest energy particles. There is a chance we may see muons from particles of mass much greater than 38 GeV (produced from collisions at the tails of the Fermi momentum distribution or from "coherent" effects). The transverse momentum distribution of these muons may show a bump corresponding to an enormously high mass object not detectable at any current accelerator. We again emphasize the combination of kinematic range, sensitivity and availability of protons on target to justify the desirability of these measurements in spite of the low probability of a positive result. Of course, we will be able to measure the continuum single muon production to the highest  $P_T$  and compare it to dimu (and prompt neutrino!) production in the same runs and much of the same apparatus.

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### VI. MULTI MU PRODUCTION

E-439 was intended as a multi-mu experiment. It was so successful as a dimu experiment, however, that solid angle was sacrificed for intensity, and that solid angle could not be recovered (because of radiation problems) in time to allow us the large solid angle low intensity running conditions needed for multi-mu running.

We envision using the apparatus proposed here during non-prompt neutrino running by bringing a small beam ( $\leq 10^9$  p/s) down to the detector and moving the central detectors in more closely to the beam line. States that decay to two  $\psi/J$ 's ( $\eta_b$ ?) should give us a very good signal since the  $\psi/J \rightarrow 2\mu$  branching ratio (7%) is reasonably large, but we may also be able to detect Ty states. And of course there is the unexpected.

### VII. THE DETECTOR

Our detector is a scaled version of the P-583 detector with the following modifications:

1 - We do the momentum measurements using superconducting solenoids filled with low Z material with detectors on both sides so that we do not depend on the vertex. This leads not only to a great improvement in the resolution over P-583 and P-618, but also removes one of the major sources of false asymmetry in the electro-weak interference measurement.

2 - We will use drift chambers for all the tracking and hodoscopes for triggering.

The apparatus is shown in Figure 1. Bending is in the vertical plane.

The resolutions of this apparatus are given approximately by:

$$\frac{\delta M}{M_{\mu\mu}} \simeq \pm \frac{1}{\sqrt{2}} \sqrt{\left(\frac{\delta P_{\mu}}{P_{\mu}}\right)^2 + \left(\frac{.25}{M_{\mu\mu}}\right)^2}$$

$$\frac{\delta P_{\perp}}{P_{\perp}} \simeq \pm \sqrt{\left(\frac{\delta P_{\mu}}{P_{\mu}}^{2} + \left(\frac{\cdot 13}{P_{\perp}}\right)^{2}\right)}$$

where 
$$\frac{\delta P_{\mu}}{P_{\mu}} \simeq \pm \sqrt{\left(\frac{.03}{P_{\mu}}\right)^2 + (.006)^2} / (1.6/P_{\mu})$$

and all variables are in GeV. Thus at high mass (high P<sub>1</sub>)

$$\frac{\delta P}{P_{\perp}} \simeq \pm 2\% \quad \text{and} \quad \frac{\delta M}{M_{\mu\mu}} \simeq \pm 1.4\%$$

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### VIII. BUDGET

	Experimenters	Fermilab
1 - Hodoscopes:		
525 new counters @ 250/counter Modify 175 existing counters Cabling for new counters New plates and mounts	131K 9K 80K 15K	
2 - Drift Chambers:		
6000 l" cells @ \$15/cell	90K	
3 - Gas, cables, connectors, tapes, etc.	50K	
4 - Magnets		
3 superconducting solenoids 4 magnetized iron		1000К 300К
5 - Electronics		
Drift chamber electronics Logic boxes Fast electronics	60K	? 500к
6 - Computer		
DDP11 data acquisition system comparable to the one used in E-439		?

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## SIDE VIEW - BENDING ELEMENTS ONLY



LEGEND:

S.S. - SUPER LONDUCTING SOLENOID (2.77) B.P. - BORATED POLYETHYLENE

P. C. - PROPORTIONAL CHAMBERS

D.C. - DRIFT CHAMBERS

H. - HODOSCOPE ARRAY (TRIGGERS)

- - Fe IRON ABSORBER
  - M.I. MAGNETIZED IRON (1.87)



## M.J. Glaubman

## ADDENDUM TO P-645

## JUNE 12, 1980

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### I - INTRODUCTION

Ever since the test run of the E-439 trigger in December 1976 it has been clear to us that the E-439 type device is ideally suited for Fermilab and that it provides the most sensitive and efficient way to use the  $\mu$  pair probe of hard hadronic collisions. People still find it difficult to adjust to the idea that one can have excellent acceptance (20% to 80% over most kinematic regions of interest) and yet have only two tracks pointing to the target in 60%-80% of the dimu triggered events at intensities up to 4 x 10<sup>11</sup> protons/sec (with a 10% duty factor!). E-439 suffered from poor resolution (> 7%) and poor angular acceptance (The apparatus was not big enough or elaborate enough). P-583 overcame the poor angular acceptance by adding two more stages of bending at small angles, and P-645 will overcome the poor resolution by separating the bending in the dump itself from the momentum measurement which is to be done in the detection area with the aid of a solenoid.

In response to the committee's question for our  $\mu$  flux at the 15 ft bubble chamber we have reconsidered the multi-stage design that we inherited from P-583 and have concluded that it is not needed in the Tevatron era. Our experiment <u>now</u> consists of two iron magnets, each 2m long, which act as the beam dump, followed by a 2m solenoid with sets of drift chambers on either side and sets of hodoscopes on the far side only (Figure I). The detectors have a V (or wedge) cut, symmetric about the vertical mid-plane, the slope of the V giving the  $p_T$  cut for an individual  $\mu$  to be accepted  $(p_T^{~S})$ . The actual  $p_T$  cut we use will depend on the beam intensity (most of our physics program tolerates  $p_T^{~S} > 1.2$  GeV, but for multi- $\mu$  running  $p_T^{~S}$  will be minimized).

Our original approach was to set up our experiment as part of a neutrino beam dump. (The figures in Appendix II show such a beam dump when

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the bubble chambers are running.) However, we now consider that possibility as only one of the options or scenarios for implementing P-645. We shall discuss it, as well as implementing P-645 in the M2 line or P-West in detail below.

### II. WHAT WILL P-645 DELIVER?

### II.a. General

The momentum resolution in P-645 is about 2%; the number of radiation lengths is about 300 (not involved in the momentum resolution). The  $2\mu$   $p_{\rm T}$  resolution is .3 GeV. The mass resolution drops from 4% at 6 GeV to 3% at 9 GeV and 2% at 15 GeV and does not depend on  $x_{\rm F}$  and  $p_{\rm T}$ .

The singles rate in the detector depends strongly on the  $p_T^S$  cut (i.e., the slope of the wedge or V). Figure II shows the number of singles over the whole detector (62 millistrd) per  $\mu$ sec, as well as overall acceptances for dimuons with masses over 6 GeV, as a function of  $p_T^S$ . The change in the singles rate as a function of  $p_T^S$  is very large and indicates the concentration of low mass events along the V boundary. The limiting factor on  $p_T^S$  in the hardware will be the average rate capacity of the individual drift chamber cell; additional constraints on triggering can be placed in the trigger logic and in the software.

Each track should register in 30 drift tubes with an off-line time resolution better than 2ns (.1 mm spatial jitter), giving 30 drift times relative to the event strobe. Eight numbers are needed for fitting two trajectories leaving 22 measured "times" for matching the track time ( $t_0$ ) to the strobe time. This should peak the  $t_0$  value by the  $\sqrt{22} \sim 4$ , i.e., to half a nanosecond. If we say that our off-line resolution is 1 nanosecond then the singles/µsec curve in Figure II <u>divided by 10<sup>3</sup></u> gives the probability of a false track in such a one nanosecond time interval.

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FIGURE I



It is important to realize that seeing the low  $p_T$  track in association with 2 higher  $p_T$  tracks cannot hurt us for the following reason. In E-439 we had a rather large  $p_T^{S}$  cut. Had an appreciable number of events been 3 track events in which the low  $p_T$  event got lost even though it was one member of the dimu pair we should have had an appreciable chance rate. Figure III is a typical CHANCE/TRUE = (LIKE SIGN)/(UNLIKE SIGN - LIKE SIGN) vs. intensity curve from E-439. Figure IV shows how sharply time residual like sign fraction drops with di- $\mu$  mass (i.e., with the  $p_T$  of the  $\mu$ 's).

# II.b. High p<sub>T</sub> Measurements

There is no experiment anywhere that remotely approaches the capability of P-645 to measure high  $p_T$  high mass dimuons produced in hard hadronic collisions. At the P-645 presentation we gave the number of dimuons in a 1 GeV<sup>2</sup> mass bin per 10<sup>17</sup> protons on tungsten as:

 $dN/dMdp_T = Accep. * 8 * 10^{12} e^{-.66(M+p_T)} / GeV^2 * 10^{17} protons$ which gives us at M = 12 GeV,  $p_T = 12$  GeV,  $dN/dMdp_T = Accep. * 10^{-11}$  events/ GeV<sup>2</sup> proton.

Figure Va shows the effect of  $p_T^S$  on the acceptance as a function of mass,  $p_T$  and the sign of  $x_F$ . Attached to it (Vb) is a two dimensional display of <u>percentage</u> acceptances in individual  $p_T \times M$  bins for  $p_T^S = .75$  GeV. Such displays give a detailed account of the acceptance over the various kinematic ranges: all the ones we show here are for  $p_T^S = .75$  GeV and they should all be self-explanatory. Thus, we see that the acceptance in the 12 GeV mass, 12 GeV  $p_T$  bin is 44%, i.e., for  $10^{17}$  protons on target we will have

 $N = .44 \times 10^{-11} \times 10^{17} = .44 \times 10^{6}$  events.

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-8-FIGURE N 100 EFFECT OF PS ON ACCEPTANCE % (INTEGRATED OVER 4, COSA, B .80 ••••• e ne prode 60 PT=12.1 XEYO 40 M=12,1  $P_T = 12.1$   $\gamma_F < 0$ 6.1 ≤ M ≤ 4,1 P7 = G,1 X=70 20 6.1 ≤ M ≤ 9.1  $P_T = 6.1 \quad \chi_F < 0$ 1.25 PTS (GeV) Ū 75 1.0 .50 IN PT VS M A-CCEPTANCES SPACE 1 SXFULL, INDEPENDENT, GRID=5N+10XF+5PT+10PHI+10CSA+10BET+2BENDIN/OUT DATE 100680/1123 BL8 HSR PT VERSUS HASS 5 1 X= MASS = (Nx-1)\*3+6.1 GeV XLOC YLCC ULOC 1007 Y= P= (Ny-1) \* 3 + 0.1 GeV BIN NOS 1 2 5 5 46. 45. 44. 41. 40. 37. 38. 38. 37. 36. 3 28. 34. 35. 35. 36. 25. 2 32. 36. 39. 42. 31. 42. 1 48. 52. 56. 0 194753 ENTRIES X-NORMAL X-OVER X-UNDER Y-OVER Ö. 0. .97E+03 **Y-NORMAL** 0. 0. Y-UNDER ٥. 0. Ô.

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To measure distributions in  $p_T$ ,  $x_F$ , M we do not need 10<sup>17</sup> protons on target. But, in addition, we have here an instrument uniquely fit to measure the dependence of the cross section on  $\cos^2 \alpha$  and  $\cos 2\beta$  (for simplicity we defined  $\alpha$  and  $\beta$ in our program in the  $\gamma^*$  center of mass using the direction of the p-nucleon center of mass as the new z axis ( $\alpha = 0$ ) and the plane it makes with the beam line as the 3 = 0 plane). The cos2 $\beta$  measurement is a polarization measurement; it can be measured independently as suggested by Thews (PRL 43, 987 (1979)) or in relation to cos  $\alpha$  as suggested by Devoto, et al. (PRL <u>43</u>, 1062 (1979)). The precision of the measurement of an asymmetry or polarization is  $1/\sqrt{2N}$ , where  $N = N^+ = N^-$ ; if  $\Delta M \Delta p_T = 2$  GeV we will have at 12 GeV, 12 GeV the value  $1/\sqrt{2N} = 10^{-3}$ , i.e., this one range of  $\Delta M \Delta p_T$  will give a precision of .001 in the asymmetry. Because of the pN asymmetry in proton-tungsten collisions it is important to do these measurements in both the forward and backward direction. In Figure VI we show 6 displays of the percent acceptance in  $\cos\alpha$ , S space for various masses,  $p_{_{\rm T}}$ , and  $x_{_{\rm F}}$  cuts. The data are considerably more impressive than the ones from the 3 stage detector that we showed at the May PAC presentation meeting.

Our mass resolution and  $p_T$  resolution at 12 GeV are 2.5%. Our momentum calibration is determined by the T, and the angle settings by straight tracks and survey data. Out trigger is 99.99% efficient (we require 4 out of 6 hodoscopes for a track) so we have no trigger biases aside from the  $p_T$ requirement, which at such high  $p_T$  is easy to enforce. We have very good  $\varphi$ acceptance - by varying  $\varphi$  (in the analysis) we can force the cos2  $\beta$  distribution through different parts of the apparatus and check for possible false sources of asymmetries.

日本の法律権の認知が必要にないたいである。

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FIGURE VIa

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	8	41.	38.	41.	44.	43.	45.	46.	45.	40.	13.	٠				
	7	38.	39.	42.	43.	40	43.	45.	46.	47	11					1.
						4Z.				7						
	6	39.	40.	41.	41.	4C.	43.	45.	47.	45.	11.					
	6 5	<b>39.</b> 37.	40.	41.	41.	40. 39.	43. 43.	45.	47. 46.	45.	11.					
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	6 5 4 3	39. 37. 34. 31.	40. 38. 36. 35.	41. 37. 37. 36.	41. 38. 38. 37.	40. 39. 40. 39.	43. 43. 42. 43.	45. 44. 43. 45.	47. 46. 48. 48.	45. 46. 43. 40.	11. 11. 7. 5.	•			•	•
	6 5 4 3 2	39. 37. 34. 31. 27.	40. 38. 36. 35. 32.	41. 37. 37. 36. 35.	41. 38. 38. 37. 37.	40. 39. 40. 39. 39.	43. 43. 42. 43. 43.	45. 44. 43. 45.	47. 46. 48. 48. 48.	45. 46. 45. 40. 32.	11. 11. 7. 5. 5.	•			•	
	6 5 4 3 2 1	39. 37. 34. 31. 27. 26.	40. 38. 36. 35. 32. 30.	41. 37. 37. 36. 35. 33.	41. 38. 38. 37. 37. 36.	40. 39. 40. 39. 39. 39.	43. 43. 42. 43. 43. 40.	45. 44. 43. 45. 45. 45.	47. 46. 48. 48. 46. 42.	45. 46. 45. 40. 32. 28.	11. 11. 7. 5. 5.	•			•	
0	6 5 4 3 2 1 7531	39. 37. 34. 31. 27. 26. ENTRI	40. 38. 36. 35. 32. 30. ES	41. 37. 37. 36. 35. 33.	41. 38. 38. 37. 37. 36.	40. 39. 40. 39. 39. 38.	43. 43. 42. 43. 43. 40. X-UN	45. 44. 43. 45. 45. 45. 43. BER	47. 46. 48. 48. 48. 46. 42. X-NC	45. 46. 45. 40. 32. 28. RNAL	11. 11. 7. 5. 5. 5.	-OVER				
0	6 5 4 3 2 1 7531	39. 37. 34. 31. 27. 26. ENTRI	40. 38. 36. 35. 32. 30. ES	41. 37. 36. 35. 33.	41. 38. 38. 37. 37. 36. Y-QUER	40. 39. 40. 39. 39. 38.	43. 43. 42. 43. 43. 40. X-UN	45. 44. 43. 45. 45. 45. 43. BER	47. 46. 48. 48. 48. 46. 42. X-NC 0.	45. 46. 45. 40. 32. 28. RMAL	11. 11. 7. 5. 5. 5.	-DVER	-	•		
0	6 5 4 3 2 1 7531	39. 37. 34. 31. 27. 26. ENTRI	40. 38. 36. 35. 32. 30. ES	41. 37. 37. 36. 35. 33.	41. 38. 38. 37. 36. Y-OVER Y-NORM	40. 39. 40. 39. 39. 38.	43. 43. 42. 43. 43. 40. X-UN 0.	45. 44. 43. 45. 45. 45. 93. BER	47. 46. 48. 48. 46. 42. X-NC 0.	45. 46. 45. 40. 32. 28. RMAL	11. 11. 7. 5. 5. 5. 0. 0.	-OVER				· · · · · · · · · · · · · · · · · · ·
0	6 5 4 3 2 1 7531	39. 37. 34. 31. 27. 26. ENTRI	40. 38. 36. 35. 32. 30. ES	41. 37. 37. 36. 35. 33.	41. 38. 38. 37. 37. 36. Y-OVER Y-NORM Y-UNDE	42. 40. 39. 39. 39. 38. AL	43. 43. 42. 43. 43. 40. X-UN 0. 0. 0.	45. 44. 43. 45. 45. 43. BER	47. 46. 48. 48. 48. 46. 42. X-NC 0. .38 0.	45. 46. 43. 40. 32. 28. RNAL	11. 11. 7. 5. 5. 5. 0. 0.	-OVER				

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FIGURE VI b

U 1 SX BL8	FULL, HGR	INDEPS 15	NDENT,	GRID≃ ′BEV	5위*10XF Campt '	*5PT# ' B	10PHI\$1 Eta Vs	IOCSA* CDSA	I OBET#	23ENDI) Ance I)	VOUT 1 ganna coi	<b>I</b> .	DATE 100680/1
HAS	TER T	ESTS	52 L(	DHASS /	M=6,1	, 9.   53	FORUD	XFZ	70	58 HID	$P_T = 6$	,IGeV	gan (tar din) gan Car ann Gan Gan Gan Car ann 140 fan dan Gal Win saf
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	9	63.	60.	60.	58.	55.	49.	45.	38.	31.	13.		
	8	61.	61.	59.	53.	48.	42.	41.	33.	30.	16.		· ·
	7	60.	57.	51.	48.	44.	41.	37.	32.	30.	18.	`	
	6	55.	52.	48.	46.	39.	35.	35.	31.	29.	19.		
	5	53.	47.	45.	40.	37.	33.	32.	32.	31.	20.	•	
	4	50.	47.	42.	36.	33.	34.	34.	33.	33.	23.		
	3	44.	38.	36.	34	31.	33.	36.	36.	39.	27.		•
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0	8102	ENTRI	ES				X-UN	DER	X-40	IRMAL	X-OVE	R	
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û			•	-	T-UNDE		¥• .		v.		V.	•	
Q 1 SX	FULL,	, INDEPI	Endent	,GRID=	7-08928	r F#5PT4	v. ∙10PHI*	10CSA+	IOBET:	2BENDI	V. H/OUT	•	DATE 100680/1
Q 1 SX Bl9	FULL, FULL,	, INDEPI 16	Endent	,GRID= 'BE\	T-URDE 5##10X ICAHPT	r F*5PT+ / B	U. 10PHI≉ Beta Vs	10CSA≠ Cosa	IOBET: ACCEPI	2BENDI TANCE I	V. H/OUT N GAHNA CO	N	DATE 100680/1
Q 1 SX BL9	FULL, Hor	, INDEPI 16	ENDENT	,GRID <sup>±</sup> 'BEV	SH*10X	K F*5PT+ 	U. TOPHI* ETA VS	10CSA¥ Cosa	10BET ACCEPT	2BENDI IANCE I	N GANNA CO	X	DATE 100680/1
Q 1 SX BL9 Has	FULL, HDR TER T	INDEPI 16 IESTS	Endeht 52 L	,GRID= 'BE\  OHASS,	т-ини2 58*10X Исанрт <i>M= G, J</i>	x F * 5 P T +  E 9, / 56	U. HOPHI≉ Eta VS Fornd	10CSA+ COSA	10BET= ACCEPT >0	2BENDI IANCE I 59 HIP	N GANNA CO T $P = 12$	H 2,1GeV	DATE 100680/1
Q 1 SX Blo Has XLQ	FULL, HOR STER T	, INDEPI 16 IESTS 5 X=	ENDENT 52 L	,GRID 'BEV OHASS	7-04021 25H*10X1 VCAHPT <i>M=6,1</i>	x F * 5 P T + E      	tophi Eta VS Foryd	10CSA¥ COSA XF	10BET ACCEP1 >0	2BENDI IANCE I 59 NIP	N GANNA CO T $P = 12$	H 2,/GeV	DATE 100680/1
Q 1 SX Bla Has XLQ YLQ	FULL HDR TER IC	, INDEPI 16 16 15 $5 \times =$	Endent 52 l cos	, GRID: BEN OHASS, C =	т-инде 5h+10X icahpt M=6,1 N X +	F * 5PT * 	•10PHI ■ETA VS • FORUD -0,09	10CSA+ COSA XF	10BET ACCEP1 >0	2BENDI IANCE I 59 HIP	NOUT N GANNA CO T $P = 12$	H 2,/GeV	DATE 100680/1
Q 1 SX Bla Has Xlo Ylo Ulo	FULL, HDR Ster T C C IC 10(	$\begin{array}{c} \text{INDEPI} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ \times = \\ 05 \\ \end{array}$	ENDENT 52 L Cos = /3	, GRID BEN OHASS,	т-undei 5h+10Xi Исанрт М= G, J N X 1 V V ж	F * 5P T *   _	• 10PHI* • ETA VS • FORND - 0, 05	$\frac{10CSA}{COSA}$	10BET ACCEP1 >0 50	2BENDI IANCE I 59 HIP	N GANNA CO T $P = 12$	H 2,/GeV	DATE 100680/1
Q 1 SX BL9 HAS XLC YLC UL0	FULL, HDR TER IC IC IC IC	$\begin{array}{c} \text{INDEPI} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ \text{X} = \\ 05 \\ \text{V} \end{array}$	ENDENT 52 L Cos = /3	, GRID $^{BEV}$ OHASS, $\mathcal{K} =$ = (	т-онде 5h*10XI Исанрт М= 6,1 NX + VX +	F#5PT#  _ 9./ 56 & O. / O./ -	0. 10PHI* BETA VS FORUD -0.05 0.05	10CSA COSA <i>X<sub>F</sub></i> 5 5 ) *	10BET ACCEP1 >0 71-/2	2BENDI IANCE I 59 HIP	N GANNA CO T $P = 12$	H 2,/GeV	DATE 100680/1
Q 1 SX BL9 HAS XLC YLC UL0 UL0 BIN	FULL, HDR Ster T C C IC 100	, INDEPI 16 IESTS $5 \times =$ $6 \times =$ $05 \times$	ENDENT 52 L COS = /3	, GRID BEV OHASS,	т-онде 5H*10XI ИСАНРТ М= 6,1 NX + V X +	F*5PT+ 9//56 E 0// -	0. 10PHI ETA VS FORUD −0,05 0,05	10CSA+ COSA <i>X<sub>F</sub></i> 5 5 ) +	0. 10BET ACCEP1 >0 77 / 2	2BENDI ANCE I 59 HIP	V. H/OUT N GAHNA CO T $P = 12$	H 2,/GeV	DATE 100680/1
Q 1 SX BL9 MAS XLC YLC ULO BIN HOS	FULL, HGR TER IC IC IC IC	$\begin{array}{c} \text{INDEPI} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ 5 \\ 5 \\ 5 \\ 5 \\ 7 \\ 1 \end{array}$	ENDENT 52 L Cos = /3 2	, GRID 'BEN OHASS	T-UNDER SH*10XI ICAHPT M=6,1 NX + VX +	F*5PT+ 9./56 E O./ O./ - 5	0. 10PHI ETA VS FORND −0,05 0,05 6	10CSA COSA <i>X<sub>F</sub></i> 5 5 7	0. 10BET: ACCEPT >0 71-/2 8	2BENDI IANCE I 59 HIP	0. N GAHNA CO T /12 1 0	H 2,/GeV	DATE 100680/1
Q 1 SX BL9 Mas XL0 YL0 VL0 BIN H09	FULL, HDR TER C C IC IC 10	$\begin{array}{c} \text{INDEPI} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ \times = \\ 05 \\ 1 \\ 1 \\ 65 \end{array}$	ENDENT 52 L Cos = /3 2	, GRID 'BEV OHASS	т-undei 5h+10Xi icahpt M=G,I NX + VУ * 4 4	F*5PT+       	0. 10PHI* SETA VS FORND -0.05 0.05 6 42	10CSA COSA <i>X<sub>f</sub></i> <i>X<sub>f</sub></i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i>	0. 10BET: ACCEP1 >0 77/2 8 8	2BENDI IANCE I 59 HIP	$\frac{0}{12}$	H 2,/GeV	DATE 100680/1
Q 1 SX BL8 HAS XLC YLC VLC BIN HOS	FULL, HOR TER 7 C C C 10 10	$\begin{array}{c} \text{INDEPI} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ \times = \\ 05 \\ 1 \\ 65. \\ 40 \end{array}$	ENDENT 52 L COS = /3 2 60.	, GRID 'BEN OHASS.	т-undei 5h*10Xi Исанрт М= 6,1 N X 1 V У Ж 4 68.	F≠5PT+ y 9./56 € 0./ 0./ - 5 62. 42	0. 10PHI DETA VS FORND -0,05 0,05 6 6 62. 65	10CSA COSA <i>X</i> <i>X</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i>	0. 10BET: ACCEP1 >0 77 / 2 8 60. 52	2BENDI IANCE I 59 HIP 9 51.	0. H/DUT N GAHNA CO T $/2 = 12$ 1 0 12. 12	H 2,/GeV	DATE 100680/1
Q 1 SX BL8 HAS XLC YL0 UL0 BIN HOS	FULL, HOR TER C C IC IC IC IC IC IC IC IC IC IC IC IC	INDEPI 16 IESTS $5 \times =$ $5 \times =$ $5 \times =$ 1 65. 60. 60.	ENDENT 52 L 005 = /3 2 60. 60.	$\mathcal{C}_{\text{BEV}}^{\text{GRID}}$	т-онdei 5h+10XI Исанрт М= 6,1 NX 1 VX 1 V X 4 68. 65. 43-	F≠5PT+  y,/58 € O, / O,/ - 5 62. 62. 63.	0. 10PHI SETA VS FORUD −0,05 0,05 6 62. 65. 45.	10CSA COSA <i>X</i> <i>X</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i>	0. 10BET ACCEP1 >0 ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	2BENDI IANCE I 59 HIP 9 51. 51.	0. H/DUT N GAHNA CO T $P = 12$ 1 0 12. 12. 13.	H 2,/GeV	DATE 100680/1
Q 1 SX BL9 HAS XLC VLC ULC BIN HOS	FULL, HDB STER_1 DC DC DC 10 F 10 9 8 7	16 16 $5 \times =$ $5 \times =$ $5 \times =$ 1 65. 60. 60. 64.	ENDENT 52 L 60. 60. 65. 65.	$\mathcal{C}_{\text{BEV}}^{\text{GRID}}$	$T - URDEN 5H + 10XI VCAHPT M = G_{1}/2M = G_{2}/2M =$	F*5PT+ 9//56 EO/ O/ 5 62. 62. 63. 65.	0. 10PHI SETA VS FORUD −0,05 0,05 6 62. 65. 65. 62.	10CSA COSA <i>X</i> <i>X</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i>	10BET ACCEP1 >0 71 /2 8 60. 57. 57. 53.	2BENDI ANCE I 59 HIP 51. 51. 44. 37.	0. H/OUT N GAHNA CO T $/2 = /2$ 1 0 12. 12. 13. 13.	H 2,/GeV	DATE 100680/1
Q 1 SX BL9 MAS XLQ VLQ ULQ BIN HOS	FULL, HDR TER IC IC IC IC IC IC IC IC IC IC IC IC IC	16 16 16 16 16 $5 \times =$ $6 \times =$ 1 65. 60. 60. 64. 65.	ENDENT 52 L COS = /3 2 60. 60. 65. 65. 63.	$ \begin{array}{c} \text{GRID} \\ \text{Bev} \\ \text{OHASS} \\ \text{CHASS} \\ CHAS$	T-UNDE 5H+10XI ICAHPT M=6,1 NX + VX + VY + 4 68. 65. 63. 63. 63. 65.	F*5PT+ 9./56 <i>Coll</i> 0.1 5 62. 62. 63. 64.	0. 10PHI ETA VS FORND -0,02 0,02 6 62. 65. 65. 62. 63.	10CSA COSA <i>X</i> <i>X</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i> <i>x</i>	10BET ACCEP1 >0 77 /2 8 60. 57. 57. 53. 51.	2BENDI ANCE I 59 HIP 51. 51. 44. 37. 32.	0. H/OUT N = GAHHA = CO T = 12 12. 12. 13. 13. 13.	H 2,/GeV	DATE 100680/1
Q 1 SX BL9 HAS XLC YLC ULO BIN HOS	FULL HDR TER C C C 10 F F F F F F F F F F F F F F F F F F	$\begin{array}{c} \text{INDEP} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ \times = \\ 05 \\ 1 \\ 65 \\ 60 \\ 60 \\ 64 \\ 65 \\ 66 \\ \end{array}$	ENDENT 52 L 005 = /3 2 60. 65. 65. 63. 65.	$\begin{array}{c} \text{GRID} \\ \text{BEV} \\ \text{OHASS} \\ \text{C} = \\ \text{C} $	$T - URDE 5H + 10XI ICAHPT M = G_{1}IM = G_{2}IM = KM = K$	× F≠5PT+ y 9./56 € 0./ 0./ - 5 62. 62. 63. 63. 64. 65.	0. 10PHI* SETA VS FORND -0,02 6 6 62. 65. 65. 62. 63. 63.	$ \begin{array}{c} 10CSA \\ COSA \\ \hline COSA $	10BET ACCEPI >0 50 57. 57. 53. 51. 46.	2BENDI IANCE I 59 HIP 51. 51. 44. 37. 32. 24.	0. H/DUT N GAHNA CO T $P = 12$ 1 0 12. 13. 13. 13. 14.	H 2,/GeV	DATE 100680/1
Q 1 SX BL8 HAS XLC YLC ULC BIN HOS	FULL HDB TER C C C C C C C C C C C C C C C C C C C	$\begin{array}{c} \text{INDEP} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ \times = \\ 05 \\ 1 \\ 65 \\ 60 \\ 64 \\ 65 \\ 66 \\ 65 \\ 65 \\ \end{array}$	ENDENT 52 L 005 = /3 2 60. 65. 65. 63. 65. 63. 65. 68.	$\begin{array}{c} \text{GRID} \\ \text{BEV} \\ \text{OHASS} \\ \text{C} = \\ \text{C} $	T - URDE 5H + 10XI NCAHPT $M = G, IM = G, I$	F≠5PT+ F≠5PT+ 9//56 € 0, / 0, / - 5 62. 63. 63. 64. 65. 64. 65. 67.	0. 10PHI* SETA VS FORND -0,05 0,05 6 62. 65. 65. 63. 63. 63. 63.	$ \begin{array}{c} 10CSA \\ COSA \\ \hline COSA $	10BET ACCEP1 >0 50 57. 57. 53. 51. 46. 37.	2BENDI ANCE I 59 HIP 51. 51. 44. 37. 32. 24. 17.	0. H/DUT N GAHNA CO T $/2 = 12$ 1 0 12. 13. 13. 13. 14. 16-	H 2,/GeV	DATE 100680/1
Q 1 SX BL8 HAS XLC YLC ULC BIN HOS	FULL HOR TER C C C C C C C C C C C C C C C C C C C	$\begin{array}{c} \text{INDEP} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ \times = \\ 05 \\ 1 \\ 65 \\ 60 \\ 64 \\ 65 \\ 66 \\ 65 \\ 70 \\ \end{array}$	ENDENT 52 L 005 = 3 2 60. 65. 65. 63. 65. 63. 65. 68. 72.	$\begin{array}{c} \text{GRID} \\ \text{BEV} \\ \text{OHASS} \\ \text{C} = \\ \text{C} $	T - URDEN 5H + 10XI NCAHPT $M = G, JM = G, J$	F≠5PT+ F≠5PT+ 9//56 € 0, / 0, / - 5 62. 63. 65. 64. 65. 67. 69.	0. 10PHI SETA VS FORUD -0,05 0,05 6 62. 65. 65. 62. 63. 63. 63. 63. 63. 60.	$ \begin{array}{c} 10CSA \\ COSA \\ \hline COSA $	10BET ACCEP1 >0 50 57. 53. 51. 46. 37. 24.	2BENDI ANCE I 59 HIP 51. 51. 44. 37. 32. 24. 17. 14-	0. H/DUT N GAHNA CO T $P = 12$ 1 0 12. 12. 13. 13. 13. 14. 16. 20.	H 2,/GeV	DATE 100680/1
Q 1 SX BL8 HAS XLC YLC ULC BIN HD9	FULL, HDB TER IC IC IC IC IC IC IC IC IC IC IC IC IC	$\begin{array}{c} \text{INDEP} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ 5 \\ 6 \\ 5 \\ 6 \\ 6 \\ 6 \\ 6 \\ 6$	ENDENT 52 L 005 = 3 2 60. 65. 65. 65. 65. 63. 65. 63. 72. 75.	$\begin{array}{c} & \text{GRID}^{*} \\ & \text{BEV} \\ & \text{BEV} \\ & \text{DHASS} \\ & \mathcal{K} = \\ & \\ & \mathcal{K}$	T - URDE 5H + 10XI NCAHPT $M = G, JM = G, J$	F*5PT+ 	0. 10PHI SETA VS FORUD -0,05 0,05 6 62. 65. 62. 63. 63. 63. 63. 63. 63. 63. 63	$ \begin{array}{c} 10CSA \\ COSA \\ \hline COSA $	10BET ACCEPI >0 71/2 8 60. 57. 57. 57. 53. 51. 46. 37. 24. 14.	220ENDI ANCE I 59 HIP 51. 51. 44. 37. 32. 24. 17. 14. 14.	0. H/OUT N GAHNA CO T $P = 12$ 1 0 12. 13. 13. 13. 14. 16. 20. 24.	H 2,1GeV	DATE 100680/1
Q 1 SX BL9 MAS XLQ VLQ ULQ BIN HOS	FULL HDR TER IC IC IC IC IC IC IC IC IC IC IC IC IC	INDEPI 16 IESTS $5 \times =$ $5 \times =$ $5 \times =$ 1 65. 60. 60. 64. 65. 65. 65. 70. 74. 71.	ENDENT 52 L 005 = 3 2 60. 65. 65. 65. 63. 65. 63. 72. 75. 71.	$\begin{array}{c} & \text{GRID}^{*} \\ & \text{BEV} \\ & \text{OHASS} \\ & \text{C} \\ &$	T - URDEN 5 H * 10XI VCAHPT $M = G, JM = G, J$	F*5PT+ 	U. 10PHI ETA VS FORUD - 0, 02 0, 02 6 62. 65. 62. 63. 63. 63. 63. 63. 63. 63. 63	$ \begin{array}{c} 10CSA \\ COSA \\ \hline COSA $	10BET ACCEPI >0 7 7 2 8 60. 57. 57. 53. 51. 46. 37. 24. 14. 14.	2BENDI ANCE I 59 HIP 51. 51. 44. 37. 32. 24. 17. 14. 16. 23.	0. H/OUT N GAHNA CO T $P = 12$ 12. 12. 13. 13. 13. 14. 16. 20. 24. 29.	H 2,/GeV	DATE 100680/1
Q 1 SX BL9 MAS XL0 VL0 BIN HOS	FULL HDR TER IC IC IC IC IC IC IC IC IC IC IC IC IC	$\begin{array}{c} \text{INDEP} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ 5 \\ 6 \\ 5 \\ 7 \\ 1 \\ 65 \\ 60 \\ 60 \\ 60 \\ 64 \\ 65 \\ 66 \\ 65 \\ 70 \\ 74 \\ 71 \\ \text{ENTRI} \end{array}$	ENDENT 52 L 52 L 52 C 5 5 5 60. 60. 65. 65. 65. 63. 65. 63. 75. 71. ES	$\begin{array}{c} \text{GRID} \\ \text{BEV} \\ \text{DHASS} \\ \mathcal{K} = \\ = \\ \begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	T - URDE 5H + 10XI M = G, J M =	F*5PT+ 9./56 <i>Corl</i> 0.1 0.1 5 62. 63. 63. 65. 64. 65. 67. 69. 62. 48.	U. 10PHI ETA VS FORND - 0, 02 0, 02 6 62. 65. 65. 63. 63. 63. 63. 63. 63. 83. 83. 83. 84. 26. X-UN	10CSA COSA COSA 7 64. 62. 60. 59. 59. 59. 59. 59. 24. 15. DER	10BET ACCEP1 >0 7 7 2 8 60. 57. 57. 57. 53. 51. 46. 37. 24. 14. 14. X-NI	2BENDI ANCE I 59 HIP 51. 51. 51. 44. 37. 32. 24. 17. 14. 16. 23. DRMAL	U. H/DUT N GAHNA CO T /2 = /2 1 0 12. 12. 13. 13. 13. 14. 16. 20. 24. 29. X-OUE	H 2,/GeV	DATE 100680/1
Q 1 SX BL8 HAS XLC YLC ULC BIN HOS	FULL HDR TER C C C C C C C C C C C C C C C C C C C	$\begin{array}{c} \text{INDEP} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ 5 \\ 6 \\ 5 \\ 6 \\ 6 \\ 6 \\ 6 \\ 6$	ENDENT 52 L 005 = 3 2 60. 65. 65. 63. 65. 63. 65. 63. 72. 75. 71. ES	$\begin{array}{c} \text{GRID}^{*} \\ \text{BEV} \\ \text{OHASS} \\ \text{C} \\ C$	Y - URDE SH + 10XI M = 6,1 M = 7,1 M = 6,1 M = 7,1	F * 5PT * E = 0, 1 =	U. 10PHI* BETA VS FORND - 0, 05 0, 05 6 62. 65. 65. 63. 63. 63. 63. 63. 63. 63. 63	10CSA COSA COSA 7 64. 62. 60. 59. 58. 55. 45. 24. 15. DER	10BET ACCEPI >0 50 57. 57. 53. 51. 46. 37. 24. 14. 14. X-N(0.	2BENDI ANCE I 59 HIP 51. 51. 44. 37. 32. 24. 17. 14. 16. 23. JRMAL	0. H/DUT N GAHNA CO T /2 = /2 1 0 12. 12. 13. 13. 13. 13. 14. 16. 20. 24. 29. X-OVE 0.	H 2,/GeV	DATE 100680/1
Q 1 SX BL8 HAS XLC YLC ULC BIN HOS	FULL HDB TER C C C C C C C C C C C C C C C C C C C	$\begin{array}{c} \text{INDEP} \\ 16 \\ \text{IESTS} \\ 5 \\ 6 \\ 5 \\ 6 \\ 5 \\ 6 \\ 6 \\ 6 \\ 6 \\ 6$	ENDENT 52 L 60. 60. 65. 63. 65. 63. 65. 71. ES	$\begin{array}{c} \text{GRID}^{*} \\ \text{BEV} \\ \text{DHASS} \\ \mathcal{K} = \\ = \\ \\ 3 \\ 60 \\ 65 \\ 63 \\ 64 \\ 65 \\ 64 \\ 66 \\ 67 \\ 74 \\ 71 \\ \end{array}$	Y - URDE SH + 10XI VCAHPT $M = G, JM = G, J$	F≠5PT+ F≠5PT+ F≠5PT+ E 0,/ 0,/ 5 62. 63. 65. 64. 65. 64. 65. 64. 65. 64. 65. 64. 82. 83. 83. 83. 84. 83. 85. 84. 85. 84. 85. 84. 85. 84. 85. 85. 85. 85. 85. 85. 85. 85	U. 10PHI* BETA VS FORND -0,05 0,05 6 62. 65. 65. 62. 63. 63. 63. 63. 63. 63. 60. 49. 26. X-UN 0. 0.	10CSA COSA COSA 7 64. 60. 59. 58. 59. 58. 55. 45. 24. 15. DER	10BET ACCEPI >0 71/2 8 60. 57. 53. 51. 46. 37. 24. 14. 14. X-N( 0. .53	2BENDI ANCE I 59 HIP 51. 51. 44. 37. 32. 24. 17. 14. 16. 23. DRMAL 3E+04	0. H/DUT N GAHNA CO T /2 = /2 1 1 0 12. 12. 13. 13. 13. 14. 16. 20. 24. 29. X-OVE 0. 0.	H 2, <i>IGeV</i> R	DATE 100680/1

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FIGURE VIC

-12-

1 S BL	XFULL 0 H63	,INDEP 25	ENDENT	,GRID≓ ′BEV	5H>10XI Cahpt	F*5PT* ′ B	10PHI* Eta Vs	tocsa* Cdsa (	10BET# Accept	23ENDII Ance II	N/OUT N GAMMA	C0%		DAT	E 100680/112
MA XL YL	STER DC DC	IESTS 5 6	53 H X = ( V =	IDHASS Cose	$M = \Lambda$ $\langle = \Lambda$	2,  55   <sub>X</sub> *	Back 0,   _  _ 0/	XF4 0.05	() - 	59 HIP	P <sub>7</sub>	= 12	,16e	7	
BI	H		/ - /		(1)	* 01					1				
NO	S	1	2	3	- 4	5	6	7	8	9	<b>Q</b>				
	10	50.	45.1	52.	47.	47.	48.	AD	37	32	34				ť
	9	45.	45.	47.	46.	45.	46.	41.	38.	32.	34.		•		
	8	41.	42.	41.	41.	43.	40.	39.	39.	34.	32.				
	7	41.	40_	38.	38.	38.	39.	38.	38.	34.	31.				
	6	41	38.	37.	37.	37.	35.	38.	39.	34.	32.				
	5	39.	41.	36.	33.	33.	36.	39	37.	35.	30.				
	4	41.	42.	40.	33.	- 33.	34.	37.	37.	36.	28.				
	3	22.	31.	35.	34.	30.	31.	37.	39.	33.	22.				
	2	17.	21.	28.	32.	31.	34.	37.	37.	28.	24.				
	1	14.	19.	25.	31.	31.	34.	36.	25.	21.	25.				•
0	3571	ENTRI	ES				X-UN	DER	X-N0	RHAL	X-1	DVER			
					Y-OVER		0.		0.		0.				
					Y-BOSH	AL.	Ô.,		.36	E+04	٥.				
~		•			Y-UNDEI	R	0.	· ·	0.		0.	•			- 19
Q 1 SI BL	XFULL 8 H5R	,IHDEP 28	ENDENT	,GRID= 'BEV	Y-UNDEI 5H+10XI Cahpt	R F\$5PT\$ 'B	0. 10PHI* ETA VS	10CSA* Cosa	O. 10BET# ACCEPT	2BENDIN ANCE IN	O. N/OUT N GANHA	COX		ĎATI	E 100680/112
D 1 S BL MA XL YL	XFULL B H5R Ster OC OC	, INDEP 28 TESTS 5 X= 6 V	ENDENT 53 H Cosp	, GRID= 'BEV IDHASS < = /	Y-UNDEI 5H*10XI CAHPT M= 12 /x * C	R F⇒5PT≠ B P, / 55 >, / − c	0. 10PHI* ETA VS FORUD 2.05	10CSA* COSA XF	0. 10BET* ACCEPT >0	2BEHDIN ANCE IN 59 NIP	0. N/OUT N GANHA T P7	сон = 12, 1	BeV	ĎATI	E 100680/112
D 1 S BL HA XL YL	XFULL 8 H5R Ster OC OC	, INDEP 28 TESTS 5 X= 6 Y=	endent 53 h Cosp /S	, GRID= 'BEV IDHASS $< = \Lambda$ $= (N_y)$	Y-UNDEI 5H*10XI САНРТ М= 12 Х ж С , ж О,	F≠5PT≠ B P, 1 55 ), 1 − c 1 − C	0. 10PHI+ ETA VS FORUD 0.05 0.05	10CSA* COSA Х <sub>F</sub> ) * П	0. 10BET* ACCEPT >0 7/2	2BEHDIN ANCE IN 59 HIP	0. N/OUT N GANHA T $P_7$	сон = /2.	BeV	ĎATI	E 100680/112
D J S. BLI HA XLI JI BI	XFULL B H5R Ster OC DC H	, INDEP 28 TESTS 5 X= 6 Y=	endent 53 m Cosp 8	, GRID =  'BEV IDHASS $< = X= (Ny)$	Y-UNDEI 5H*10XI CAHPT M= 12 X * C 1 * O1	F⇒5PT≠ B P, 1 56 ), 1 - C 1 - C	0. 10PHI* ETA VS FORUD 2.05	10CSA* COSA X <sub>F</sub> ) * T	0. 10BET# ACCEPT >0 -/2	2BEHDIN ANCE IN 59 HIP	0. N/OUT N GANHA T P7 1	сон - 12,	BeV	ĎATI	E 100680/112
D 1 S BL MA XL YL BI HO	XFULL B HGR Ster OC OC N S	, INDEP 28 TESTS 5X = 5X = 7 = 1	endent 53 m Cos p 3	$GRID= \frac{1}{100}$ $IDHASS < = N$ $= (N)$ $3$	Y-UNDEI 5H*10XI CAHPT M= 12 X * C X * C X * A	F=5PT= B 2, 1 56 3, 1 - 0 1 - 0 5	0. 10PHI* ETA VS FORUD 0.05 0.05 0.05	10CSA* COSA X <sub>F</sub> ) * T	0. 10BET# ACCEPT >0 -/2 8	2BENDIN ANCE IN 59 HIP	0. N/OUT N GAHHA T P7 1 0	cox = 12.	GeV	ĎATI	E 100680/112
D JSJ BL HA XL YL BI HO	XFULL B H5R Ster OC DC N S 10	, INDEP 28 TESTS $5 \times =$ $6 \times =$ 1	ehdeht 53 h Cosp 8 2	$ \begin{array}{c} \text{GRID} = \\ \text{'BEV} \\ \text{IDHASS} \\ \text{C} = \\ \text{(N)} \\ \text{C} $	Y-UNDEI 5H*10XI CAHPT M= 12 Vx * C x * O, 4	$F \Rightarrow 5PT \Rightarrow B$ $P_{1} = 5$ $D_{1} = 0$ $T = 0$ $S$	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA	0. 10BET* ACCEPT >0 -/2 8	2BEHDIN ANCE IN 59 NIP 9	0. N/OUT N GANHA T P7 1 0 39	сон = 12.	BeV	ĎATI	E 100680/112
D 1 S BL NA XL YL BI HO	XFULL B HGR Ster OC DC N S 10	, INDEP 28 TESTS $5 \times =$ $6 \times =$ 1 60.	EHDENT 53 H Cosp B 2 60.	$ \begin{array}{c} \text{FRID} \\ \text{'BEV} \\ \text{IDHASS} \\ \text{'} = N \\ \text{'} \\ $	Y-UNDEI 5H*10XI CAHPT M= 12 X * C X * C X * C X * A	F⇒5PT≠ B P, / 56 >, / - 0 / - 0 5 64.	0. 10PHI+ ETA VS FORUD 0.05 0.05 0.05 6 6 61. 55	10CSA* COSA	0. 10BET* ACCEPT >0 -/2 8 47. 42	2BEHDIN ANCE IN 59 HIP 9 37.	0. N/OUT N GANHA T P7 1 0 39. 38.	сон = 12,	1 BeV	ĎATI	E 100680/112
D 1 S BL HA XL YL BI HO	XFULL B H5R STER OC OC N S 10 9 8	, INDEP 28 TESTS $5 \times =$ $6 \times =$ 1 60. 60. 60. 65	EHDEHT 53 H C 05 P 8 2 60. 68. 42	$ \begin{array}{c} \text{GRID} = \\ \text{'BEV} \\ \text{IDMASS} \\ \text{'} = \\ \text{(N)} \\ \text{'} $	Y-UNDEI 5H+10XI CAHPT M= 12 X * C X * C X * C 4 60. 60.	F=5PT= B 2, 1 56 3, 1 - 0 1 - 0 5 64. 65.	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA X <sub>F</sub> ) * T 7 52. 50.	0. 10BET* ACCEPT > 0 -/2 8 47. 42. 38	2DEHDIN ANCE IN 59 HIP 9 37. 35. 32	0. N/OUT N GANHA T P7 1 0 39. 38. 41.	сон = 12, 1	1 BeV	ĎATI	E 100680/112
D 1 S BL MA XL YL BI HO	XFULL B HGR GTER DC DC N S 10 S 10 S 2	, INDEP 28 TESTS 5 X= 6 Y= 1 60. 60. 65. 42	EHDEHT 53 H Cosp 8 2 60. 68. 62. 42	$ \begin{array}{c} \text{GRID} = \\ \begin{array}{c} \text{BEV} \\ \text{IDHASS} \\ \text{C} = \\ \end{array} $ $ \begin{array}{c} \text{C} \\ \text{C} \\$	Y-UNDEI 5H+10XI CAHPT M= 12 X * C X * C X * C 4 60. 60. 65. 40	F=5PT= B C, 1 56 D, 1 - C 1 - C 5 64. 65. 61. 57	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA $\chi_{F}$ ) * T 7 52. 50. 46. 43	0. 10BET * ACCEPT > 0 7/2 8 47. 42. 38. 34	2BEHDIN ANCE IN 59 HIP 9 37. 35. 32. 34	0. N/OUT N GAHHA T P7 1 0 39. 38. 41. 42.	cox = 12,	1 GeV	ĎATI	E 100690/112
D 1 S BL MA XL YL BI HO	XFULL B HGR Ster OC DC N S 10 9 8 7 4	, INDEP 28 TESTS 5X = 4 40. 60. 60. 65. 62. 45	53 H 53 H COSP 3 2 60. 68. 62. 62.	$ \begin{array}{c} \text{BRID} = \\ \text{1BEV} \\ \text{1DHASS} \\ \text{C} = \\ \text{N} \\ \text{C} \\ $	Y-UNDEI 5H+10XI CAHPT M= 12 X * C X * C X * C 4 60. 60. 65. 60.	F=====================================	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA X * T 52. 50. 45. 43. 29	0. 10BET ACCEPT > 0 -/2 8 47. 42. 38. 36. 31	2BEHDIN ANCE IN 57 HIP 37. 35. 32. 36. 34	0. N/OUT N GAHHA T P7 1 0 39. 38. 41. 42. 44.	cox = 12.	BeV	ĎATI	E 100680/112
D 1 S BL MA XL YL BI HO	XFULL B HGR STER OC DC N S 10 S 10 S 7 6 5	, INDEP 28 TESTS $5 \times =$ $6 \times =$ 1 60. 60. 65. 75. 7	53 H 53 H Cose 8 60. 68. 62. 63. 42	$ \begin{array}{c} \text{GRID} = \\ \text{'BEV} \\ \text{IDHASS} \\ \text{C} = \\ \text{N} \\ \text{C} \\ $	Y-UNDEN 5H*10XI CAHPT M= 12 X * 0 X * 0 4 60. 60. 65. 60. 55.	$F \Rightarrow 5PT \Rightarrow$ B =	0. 10PHI* ETA VS FORUD 0.05 0.0	$\chi_{F}$ $\chi$	0. 10BET≠ ACCEPT > 0 -/2. 8 47. 42. 38. 36. 31. 35.	2BEHDIN ANCE IN 59 HIP 37. 35. 32. 36. 36.	0. N/OUT N GANHA T P7 1 0 39. 38. 41. 42. 46. 50.	cox = 12.	1 GeV	ĎATI	E 100680/112
D JSJ BL NA XL YL BI HO	XFULL BHSR STER OC DC N S 10 9 8 7 6 5	, INDEP 28 15575 $5 \times =$ $6 \times =$ 1 60. 65. 65. 65. 65. 61. 63.	EHDEHT 53 H C 03 P 8 60. 68. 62. 63. 62. 63. 62. 63.	$ \begin{array}{c} \text{GRID} = \\ \text{'BEV} \\ \text{IDHASS} \\ \text{C} = \\ \text{(N)} \\ \text{C} $	Y-UNDEN 5H+10XI CAHPT M= 12 X * 0 X * 0 X * 0 4 60. 60. 65. 60. 55. 57. 54	$F \Rightarrow 5PT \Rightarrow$ B =	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA X= X= 7 52. 50. 46. 43. 39. 36. 38.	0. 10BET* ACCEPT > 0 -/2 8 47. 42. 38. 36. 31. 35. 41.	2BEHDIN ANCE IN 59 HIP 37. 35. 32. 36. 36. 44. 49.	0. N/OUT N GANHA T P7 1 0 39. 38. 41. 42. 46. 50. 54.	сон = /2,	1 BeV	ĎATI	E 100680/112
D 1 S BL NA XL YL BI HO	XFULL 8 H5R 9 CC 9 CC N S 10 9 8 7 6 5 4 3	, INDEP 28 15575 $5 \times =$ $6 \times =$ 60. 60. 60. 65. 62. 61. 63. 63. 63. 63.	EHDENT 53 H Cosp 2 60. 68. 62. 63. 63. 63. 63. 63.	$ \begin{array}{c} \text{BRID} = \\ \text{BEV} \\ \text{IDMASS} \\ \text{C} = \\ \begin{array}{c} \text{M} \\ \text{S} \\ \text{C} \\ \text{C} \\ \text{S} \\ \text{C} \\ \text{S} \\ \text{S} \\ \text{S} \\ \text{S} \\ \end{array} $	Y-UNDEN SH+10XI CAHPT M = 12 $X \times 0$ $X \times 0$ 4 60. 60. 65. 60. 55. 57. 54. 52.	$F \Rightarrow 5PT \Rightarrow B$ P, 1 = 56 p, 1 = 66 1 = 64 64 65 64 53 54 51 47 $4\lambda$	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA $\chi_{F}$ $\chi_{F}$ $\chi_{T}$ 7 52. 50. 43. 39. 35. 38. 43.	0. 10BET* ACCEPT > 0 -/2 8 47. 42. 38. 36. 31. 35. 41. 46.	2BEHDIN ANCE IN 59 HIP 59 AIP 37. 35. 32. 36. 36. 44. 49. 53.	0. N/OUT N GANHA T P7 1 0 39. 38. 41. 42. 46. 50. 54. 59.	сон = 12,	1 BeV	ĎATI	E 100680/112
D 1 S BL MA XL YL BI HO	XFULL 8 HGR 9 TER 9 CC 9 CC 10 9 8 7 6 5 4 3 2	, INDEP 28 15575 $5 \times =$ $6 \times =$ 1 60. 65. 65. 61. 63. 63. 72.	EHDEHT 53 H Cosp 8 60. 62. 63. 62. 63. 62. 63. 62. 63. 62. 63. 62.	$ \begin{array}{c} \text{BRID} = \\ \text{BEV} \\ \text{IDHASS} \\ \text{IDHASS} \\ \text{C} = \\ \begin{array}{c} \text{N} \\ \text{S} \\ \text{C} \\ \text{S} \\ \text{C} \\ \text{S} $	Y-UNDEI 5H+10XI CAHPT M= 12 X * 0, 4 60. 60. 65. 60. 55. 57. 54. 52. 48.	$F \Rightarrow 5PT \Rightarrow$ B =	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA COSA X - X - 7 52. 50. 45. 39. 35. 38. 43. 41.	0. 10BET* ACCEPT > 0 -/2 8 47. 42. 38. 36. 31. 35. 41. 46. 44.	2DEHDIN ANCE IN 59 HIP 59 AIP 37. 35. 32. 36. 36. 44. 49. 53. 57.	0. N/OUT N GANHA T P7 1 0 39. 38. 41. 42. 46. 50. 54. 59. 65.	сон = 12,	1 BeV	ĎATI	E 100680/112
D 1 S BL MA XL YL BI HO	XFULL 8 HGR STER OC DC NS 10 9 8 7 6 5 4 3 2	, INDEP 28 TESTS $5 \times =$ 60. 60. 60. 65. 61. 63. 63. 63. 72. 69.	ENDENT 53 H 53 H 53 A 53 A 53 A 54 52 52 52 52 52 53 52 52 52 53 53 53 53 53 53 53 53 53 53	$ \begin{array}{c} \text{BRID} = \\ \text{IDHASS} \\ \text{IDHASS} \\ \text{C} = \\ \begin{array}{c} \text{N} \\ \text{S} \\ \text{C} \\ \text{S} \\ \text{C} \\ \text{S} \\ $	Y-UNDEN 5H+10XI CAHPT M= 12 X * 0, 4 60. 60. 65. 60. 55. 57. 54. 52. 48. 31.	$F \Rightarrow 5PT \Rightarrow B$ $P_{1} = 56$ $P_{1} = 56$	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA $\chi_{F}$	0. 10BET* ACCEPT > 0 -/2 8 47. 42. 38. 36. 31. 35. 41. 46. 46. 54.	2BEHDIN ANCE IN 59 HIP 59 AIP 37. 35. 32. 36. 36. 44. 49. 53. 57. 67.	0. N/OUT N GAHHA T P7 1 0 39. 38. 41. 42. 46. 50. 54. 59. 63. 69.	сон - 12,	IGeV	ĎATI	E 100690/112
D 1 S BL MA XL YL BI HO	XFULL B HGR STER OC DC N S 10 9 8 7 6 5 4 3 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	, INDEP 28 TESTS $5 \times =$ $6 \times =$ $7 \times =$ $7 \times =$ $7 \times =$ $6 \times =$ $7 \times =$ $7 \times =$ $7 \times =$ $6 \times =$ $7 \times =$	ENDENT 53 H 60. 68. 62. 63. 62. 63. 62. 63. 62. 52. FS	$ \begin{array}{c} \text{BRID} = \\ \text{BEV} \\ \text{IDHASS} \\ \text{IDHASS} \\ \text{C} = \\ \begin{array}{c} \text{N} \\ \text{S} \\ \text{C} \\ \text{S} \\ \text{C} \\ \text{S} $	Y-UNDEN 5H+10XI CAHPT M= 12 X * 0 X * 0 4 60. 65. 60. 55. 57. 54. 52. 48. 31.	$F \Rightarrow 5PT \Rightarrow B$ P = 1 - 2 P	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA $\chi_{F}$ $\chi_{F}$ $\chi_{T}$ 7 52. 50. 48. 43. 39. 38. 43. 41. 46. DER	0. 10BET* ACCEPT > 0 -/2. 8 47. 42. 38. 36. 31. 35. 41. 46. 46. 56. X-HD	2DEHDIN ANCE IN 59 NIP 59 NIP 9 37. 35. 32. 36. 36. 44. 49. 53. 57. 67. 884	0. N/OUT N GANHA T PT 1 0 39. 38. 41. 42. 46. 50. 54. 59. 65. 69. X-	COX = /2.	1 BeV	ĎATI	E 100680/112
D 1 S BL NA XL YL BI HD	XFULL B HGR STER OC OC N S 10 9 8 7 6 5 4 3 2 1 184	, INDEP 28 TESTS $5 \times =$ $6 \times =$ 1 60. 60. 65. 62. 61. 63. 72. 63. 72. 63. 72. 63. 72. 7	EHDENT 53 H 53 H 53 A 53 A 52 A 52 A 52 A 52 A 52 A 52 A 52 A 52	$ \begin{array}{c} \text{GRID} = \\ \text{'BEV} \\ \text{IDHASS} \\ \text{C} = \\ \begin{array}{c} \text{N} \\ \text{S} \\ \text{C} \\ \text{C} \\ \text{S} \\ \text{C} \\ \text{S} \\ $	Y-UNDEN 5H+10XI CAHPT M= 12 X * 0 X * 0 4 60. 60. 65. 60. 55. 57. 54. 52. 48. 31. Y-DUER	$F \Rightarrow 5PT \Rightarrow B$ P = 1 - 2 P	0. 10PHI* ETA VS FORUD 0.05 0.5 0.	10CSA* COSA X X - X - 7 52. 50. 46. 43. 39. 36. 38. 41. 46. DER	0. 10BET* ACCEPT > 0 -/2 8 47. 42. 38. 36. 31. 35. 41. 46. 46. 56. X-HD 0-	2BEHDIN ANCE IN 59 HIP 59 AIP 37. 35. 32. 36. 36. 44. 49. 53. 57. 67. NMAL	0. N/OUT N GANHA T P7 1 0 39. 38. 41. 42. 46. 50. 54. 59. 63. 69. X-	COX = /2,	1 BeV	ĎATI	E 100680/112
D JSJ BL NA XL YL BJ HD	XFULL B H5R STER OC DC N S 10 9 8 7 6 5 4 3 2 1 5 184	, INDEP 28 15575 $5 \times =$ $6 \times =$ 60. 60. 60. 65. 63. 63. 63. 63. 63. 63. 63. 63. 63. 60. 63. 63. 60. 63. 60. 63. 60. 63. 60. 61. 60. 63. 60. 63. 60. 61. 63. 60. 63. 60. 61. 63. 60. 61. 60. 63. 60. 61. 63. 60. 61. 63. 61.	EHDENT 53 H 53 H 53 H 53 A 60. 68. 62. 63. 62. 63. 62. 63. 62. 52. ES	$ \begin{array}{c} \text{GRID} = \\ \text{'BEV} \\ \text{IDHASS} \\ \text{C} = \\ \begin{array}{c} \text{N} \\ \text{S} \\ \text{C} \\ \text{C} \\ \text{S} \\ \text{C} \\ \text{S} \\ $	Y-UNDEN SH+10XI CAHPT M= 12 X * 0 X * 0 4 60. 60. 65. 60. 55. 57. 54. 31. Y-DVER Y-NDSH	$F \Rightarrow 5PT \Rightarrow B$ P, f = 56 p, f = 56 p, f = 66 f = 64 65 64 65 64 53 54 51 47 46 43 31 AI	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA COSA X 7 52. 50. 46. 43. 39. 36. 38. 41. 46. DER	0. 10BET* ACCEPT > 0 -/2 8 47. 42. 38. 36. 31. 35. 41. 46. 46. X-HD 0. 57	2BEHDIN ANCE IN 59 HIP 59 HIP 37. 35. 32. 36. 36. 44. 49. 53. 57. 67. 57. 67. 57. 67. 57.	0. N/OUT N GANHA T P7 1 0 39. 38. 41. 42. 46. 50. 54. 59. 63. 69. X- 0. 0.	COX = /2,	1 BeV	ĎATI	E 100680/112
D J S BL HA XL YL BI HD	XFULL 8 H5R 9C 9C 9C 10 9 8 7 6 5 4 3 2 1 5184	, INDEP 28 TESTS $5 \times =$ $6 \times =$ 60. 60. 60. 60. 60. 60. 61. 63. 63. 63. 63. 63. 63. 64. 74. 74. 74. 74. 74. 74. 74. 74. 74.	EHDENT 53 H 60. 68. 62. 63. 62. 63. 62. 63. 62. 52. ES	$ \begin{array}{c} \text{FRID} = \\ \text{'BEV} \\ \text{IDHASS} \\ \text{IDHASS} \\ \text{C} = \\ \begin{array}{c} \text{N} \\ \text{S} \\ \text{C} \\ \text{S} \\ \text{S}$	Y-UNDEN SH+10XI CAHPT M= 12 X * 0 X * 0 4 60. 60. 65. 55. 57. 54. 52. 48. 31. Y-UVER Y-NDRH Y-NDRH	$F \Rightarrow 5PT \Rightarrow B$ P, / 56 P, / 56 / - 0 / - 0 64. 65. 61. 53. 54. 51. 47. 46. 31. AL	0. 10PHI* ETA VS FORUD 0.05 0.0	10CSA* COSA COSA X 7 52. 50. 43. 39. 35. 33. 41. 46. DER	0. 10BET* ACCEPT > 0 -/2 8 47. 42. 38. 36. 31. 35. 41. 46. 46. 56. X-HD 0. 52. 0-	2BEHDIN ANCE IN 59 HIP 59 HIP 37. 35. 32. 36. 36. 44. 49. 53. 57. 67. RMAL E+04	0. N/OUT N GANHA T P7 1 0 39. 38. 41. 42. 46. 50. 54. 59. 63. 65. 65. 65. 69. X- 0. 0.	COX = /2,	1 BeV	ĎATI	E 100680/112

Q

We again remind the committee of the possibility of highly unusual effects at extremely high  $p_T$ , and that we will be able to measure the  $p_T$  dependence of the T to extremely high values (e.g., Higgs  $\rightarrow \psi + \gamma$  or T +  $\gamma$  giving a peak in the  $p_T$  distribution).

## II.c. Low $p_{T}$ Measurements (Drell-Yan)

The proposed apparatus is unparalleled in its capacity for studying  $x_F$  and angular distributions of the T and the continuum at low  $p_T$  also. Furthermore, if we are located where high intensity pion or  $\bar{p}$  beams are available it can be used for the extension of the CIP program (e.g., E-615) and the  $\bar{p}$  dimu production measurements of Cox (E-537). For these purposes there would be a distinct advantage in setting up the P-645 apparatus in P-West.

### II.d. Weak-Electromagnetic Interference

It is important that the committee realize that most of the objections to P-583 are not valid for P-645.

a - The P-645 resolution is much better and the mass range, as well as the number of events per mass bin above the T, is much larger than in the original (P-583) proposal. We have a very large range (more than 10 GeV above the T) over which we expect very high yields so that the  $q^2$  dependence of the asymmetry a (which is proportional to  $q^2$ ) can be measured point to point to the third decimal place. At 18 GeV we will have

 $\frac{dN}{dM}$  = Acceptance x 5.5 x 10<sup>-10</sup> events/GeV proton.

Assuming that  $\frac{d\sigma}{dx_F} = A(1 - |x_F|)^n$  and defining  $\xi \equiv 1 - |x_F|$  then:

$$\int_{\xi_{1}}^{\xi_{2}} \frac{d\sigma}{dx_{F}} dx_{F} = A \frac{\xi_{1}^{n+1} - \xi_{2}^{n+1}}{n+1} \text{ and } \int_{-1}^{1} \frac{d\sigma}{dx_{F}} dx_{F} = \frac{2A}{n+1}$$

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so at 18 GeV:

 $\frac{dN}{dM} = \text{Acceptance} * 5.5 \times 10^{-10} * \frac{\xi_1^{n+1} - \xi_2^{n+1}}{2} \text{ events/GeV proton.}$ From E-439 n ~ 2.7 so for .3  $\leq x_F \leq .7$  ( $\xi_1 = .7, \xi_2 = .3$ )

 $\frac{dN}{dM}$  = Acceptance x 7 x 10<sup>-11</sup> events/GeV proton .

From the enclosed tables the acceptance at 18 GeV, "Forwd" is 81% from  $\cos \alpha = -.55$  to  $\cos \alpha = .55$  and drops to 46% at  $\cos \alpha = \pm .85$ , so taking 70% as an average, we have per  $10^{16}$  protons (only  $10^{16}$  protons!) 5 x  $10^{5}$  events/GeV which gives  $\delta a = \frac{1}{\sqrt{2N}} = 10^{-3}$ .

b - We also show acceptances in the central  $x_F$  region (where the asymmetry goes to zero) and in the backward hemisphere where the interference changes from being predominantly due to us to being much more dd. These different regions should allow a definitive differentiation between the physics and the systematic errors.

c - As mentioned in the recent PAC presentation, the major source of systematic error in P-583 was the fact that the vertex was used in the momentum measurement, which is not the case in P-645.

d - Should P-645 be set up where there is also a high intensity pion beam, then the asymmetry could also be measured using pion beams. Whether this will lead to a more sensitive experiment is debatable, but the theoretical interpretation of the data may be simpler. We enclose the acceptance tables for 400 GeV beam particles showing that our apparatus is suitable for angular distribution studies at that energy too.

# FIGURE VI

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100 EFFECT OF PST ON AVERAGE % ACCEPTANCE PT= . I GeV -30 6,1 4 MASS & 15,1 GeV  $3 \leq \chi_F \leq .7$ 60  $1 \leq \chi_F \leq .1$ .40  $-.7 \leq \chi_F \leq -.3$ 20  $P_T^{\rm s}(GeV)$ 175 1.25 125 .50 1.0

# FIGURE VIII a

BLB HGR	,INDEP 77	ENDENT I	GRID: "Asi	=5H+10X  /H	F≠5PT≠ ^ Asyr	HOPHI+10CSA	*10BET*2BENDI N ACCEPTANCE	N/OUT	DATE 100680/112
HASTER XLOC	TESTS	17 PI	rcut	R:	= , /	GeV			99 - 99 - 99 - 99 - 99 - 99 - 90 - 99 - 90 - 9
YLOC	5X=	MAS	5 =	(Nx-	·/)×	3+6,10	Sev		
alos iu	) Y=	cas.	x =	Ny >	e0,1	-0.05			·
BIH		· •	-		_			27	
NOS	1	2	3	4	5				
10	^	•	•		17		•		· · · · · · · · · · · · · · · · · · ·
10	V. 15	2 A 1	イル つち	9. 20	13.	·		,	
7	10.	67. 71	23.	20. 70	4/ + 70				
9	20 +	31.	30. Att	38. */	37.				
	30.	3/ .	43.	40.	31.				
6	39.	43.	JV.	34.	<b>61.</b>				
5	36.	48.	20.	61.	67.				
4	37.	54.	57.	68.	72.				•
3	41.	58.	63.	71.	74.				
2	43.	61.	69.	73.	76.				
1	46.	65.	70.	75.	78.				
0 45761	ENTRI	ES				X-UHDER	X-NORHAL	X-DVER	
				Y-OVER		0.	0.	0.	-
				Y-NORN	AL	.Q.	.23E+04	<b>0.</b>	•
				Y-UNDE!	R	0.	Q.	0.	•
1 SXFULL	.,INDEP	ENDENT,	.GRID:	•5#+10XI	F#5PT#	10281*10054	+10057+005807	N/OUT	BATE 100480/112
BLO NOA	8		'AS1	(H	ASYN	HETRY BACKS	ARD ACCEPTANC	E	
HASTER	TESTS	17 PI	AST	$\frac{P}{T}=0,$	' ASYN / 61	HETRY BACKS BACKFX _	ARD ACCEPTANC .7 $\leq \chi_{F}$	€ <73	
HASTER XLDC	8 TESTS 1 5 X=	17 PI Mias	ASI ICUT /	$\frac{P}{T} = 0,$	' ASYN / 61	BACKFX	ARD ACCEPTANC $.7 \le X_F \le$	E <-,3	
HASTER XLDC YLDC	8 8 TESTS 1 5X=	17 P1 Mas	'AS) 1CUT / 2 = (	$\frac{P_{T}=0}{N_{T}}$	/ 61 - /) *	BACKFX _ = 3 + G, 1 C	ARD ACCEPTANC .7 $\leq X_F \leq$	E <-,3	
HASTER XLDC YLDC NLDC 10	$\frac{1}{5} \times \frac{1}{5} \times \frac{1}$	17 PI Mas Cosa	'Ast reut / S = ( =	$ \frac{P_T = 0}{N_X} - N_Y \times $	/ 61 / 61 - /) *	HETRY BACK BACKFX - - 0,05	ARD ACCEPTANC $.7 \le X_F \le$	€ <73	
HASTER XLDC YLDC NLDC 10 BIN	$\frac{1}{5} \times \frac{1}{5} \times \frac{1}$	17 PI Mas Cosa	^Ast rcut / ( 	$ \frac{P_{T}=0}{N_{T}} $ $ \frac{N_{T}}{N_{T}} $	- 1) * - 0,1	HETRY BACK BACKFX - - 0,05	ARD ACCEPTANC .7 $\leq X_F$	€ <7,3	
HASTER XLDC YLDC NLDC 10 BIN NDS	$\frac{1}{5} \times \frac{1}{5} \times \frac{1}$	17 PI Mas Cosa 2	*A5) icut / = 2 = ( =	14 P= 0, Nx - Ny x 4	ASYA / 61 - /) * - /) * - /) 5	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 $\leq X_F$	E {-, 3	
HASTER XLOC YLOC ULOC 10 BIN NOS 10	$\frac{1}{5} \times \frac{1}{5} \times \frac{1}$	17 P1 Mas Cosa 2 0.	145) ICUT / = 3 0.	$ \frac{P_{T}=0}{N_{T}} $ $ \frac{N_{T}}{N_{T}} $ $ \frac{N_{T}}{N_{T}} $ $ \frac{N_{T}}{N_{T}} $	ASYF / 61 - /) * - /) * - /) * - /) * - /) *	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 $\leq X_F$	€ <73	
HASTER XLDC YLDC WLDC 10 BIN NDS 10 9	$\frac{1}{5} \times \frac{1}{5} \times \frac{1}$	17 P1 Mas Cosa 2 0.	^AS)  [CUT / = 3 0. 1.	$ \begin{array}{c} P_{T} = 0, \\ N_{T} = 0, \\ N_{T} = 0, \\ N_{T} = 0, \\ N_{T} = 0, \\ \theta_{T} = 0,$	ASYR / 61 /)* 0,/ 5 0. 10.	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 $\leq X_F$	E <-, 3	
HASTER XLDC YLDC VLDC 10 BIN NDS 10 9 8	$\begin{array}{c} 8 \\ 1 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7$	17 P1 MAS Cosa 2 0. 0. 1.	'A5) ICUT / S = ( = 3 0. 1. 12.	$ \frac{P_{T}=0}{N_{X}-1} $ $ \frac{N_{Y}}{N_{Y}} \times 4 $ $ \frac{0}{18} $	ASYR / 61 - /) * - // *	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 $\leq X_F$	E <-, 3	
HASTER XLDC YLDC NLDC 10 BIN NDS 10 9 8 7	$\begin{array}{c} 8 \\ 1 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7$	17 P1 MAS Cosa 2 0. 1. 10.	^A5) ICUT / S = ( = 3 0. 1. 12. 24.	$ \begin{array}{c}     F_{T} = 0, \\     N_{T} - 0, \\     N_{T} - 0, \\     N_{T} + 0, \\     8. \\     18. \\     32. \\ \end{array} $	ASYF / 61 - /) * 0, / 5 0. 10. 26. 49.	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 $\leq X_F$	E <-, 3	
HASTER XLDC YLDC NLDC 10 BIN NDS 10 9 8 7 6	$\begin{array}{c} 8 \\ 1 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7$	17 P1 MAS Cosm 2 0. 1. 10. 20.	'A5) ICUT / S = ( = 3 0. 12. 24. 33.	$ \begin{array}{c}         (H) \\                                    $	ASYR / 61 / 61 / 61 / 61 / 8 0.1 5 0. 10. 26. 49. 66.	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 $\leq X_F$	E <-, 3	
HASTER XLDC YLDC NLOC 10 BIN NDS 10 9 8 7 6 5	$\frac{1}{5} \times \frac{1}{5} \times \frac{1}$	17 P1 MAS Cosa 2 0. 1. 10. 20. 26.	- A5) - CUT / 	$ \begin{array}{c}         (H) \\                                    $	ASYR / 61 / 61 / * 0,/ 5 0. 10. 26. 49. 66. 73.	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 $\leq X_F$	E <-, 3	
HASTER XLDC YLDC VLDC 10 BIN HDS 10 9 8 7 6 5 4	$\begin{array}{c} 8 \\ 1 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7$	17 P1 MAS Cost 2 0. 0. 1. 10. 20. 26. 36.	1A5) (CUT / S = ( = 3 0. 1. 12. 24. 33. 47. 57.	$ \begin{array}{c}         (H) \\                                    $	ASYR / 61 / 61 / * / * / * / * / * / * / * / * / * / *	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 ≤ X <sub>F</sub> : SeV	E <-, 3	
HASTER XLDC YLDC VLDC 10 BIN NDS 10 9 8 7 6 5 4	$\begin{array}{c} 8 \\ 1 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7$	17 P1 MAS CSSA 2 0. 0. 1. 10. 20. 26. 36. 43.	1A5) (CUT / S = ( = 3 0. 12. 24. 33. 47. 57. 65.	$ \begin{array}{c}         (H) \\                                    $	ASYN / 61 / 61 / 61 - /) * - /) *	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 ≤ X <sub>F</sub> : SeV	E <-, 3	
HASTER XLDC YLDC ULOC 10 BIN NDS 10 9 8 7 6 5 4 3 2	$\begin{array}{c} 8 \\ 1 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7$	17 P) MAS CSSA 2 0. 0. 1. 10. 20. 26. 36. 43. 50-	'AS)         'CUT /         S = (         3         0.         12.         24.         33.         47.         57.         65.         73.	$ \begin{array}{c}         (H) \\                                    $	ASYN / 61 / 61 / 61 / * 0. 10. 26. 49. 66. 73. 79. 85. 90.	HETRY BACK BACKFX _ - 0,05	ARD ACCEPTANC .7 $\leq X_F$ SeV	ξ-, 3	
HASTER XLDC YLDC NLDC 10 BIN NDS 10 9 8 7 6 5 4 3 2 1	$\begin{array}{c} 8 \\ 1 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7$	17 P) MAS Coss of 2 0. 1. 10. 20. 26. 36. 43. 50. 57.	-A5) (CUT / S = ( = 3 0. 12. 24. 33. 47. 57. 65. 73. 77.	$ \begin{array}{c}         (H) \\                                    $	ASYN / 61 / 61 / * 60, / 5 0. 10. 26. 49. 66. 73. 79. 85. 90. 94.	HETRY BACK BACKFX _ - 0,05	$.7 \le X_F \le$	ξ-, 3	
HASTER XLDC YLDC NLDC 10 BIN NDS 10 9 8 7 6 5 4 3 2 10 10429	8 TESTS 1 5 5 	17 P) MAS Coss d 2 0. 1. 10. 20. 26. 36. 43. 50. 57. E5	'A5)         'CUT /         S = (         3         0.         12.         24.         33.         47.         57.         65.         73.         77.	$ \begin{array}{c}         (H) \\                                    $	ASYR / 61 / 7 / 7 / 8 / 61 / 7 / 8 / 61 / 7 / 8 / 61 / 7 / 7 / 8 / 61 / 7 / 7 / 8 / 7 / 7 / 8 / 7 / 7 / 8 / 7 / 7 / 8 / 7 / 7 / 7 / 7 / 7 / 7 / 7 / 7	HETRY BACKU BACKFX _ - 0,05	X-NORMAL	¥-8υfr	
HASTER XLDC YLDC NLOC 10 BIN NDS 10 9 8 7 6 5 4 3 2 1 0 10429	8 TESTS 1 5 7 1 1 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	17 P) MAS CSSA 2 0. 1. 10. 20. 26. 36. 43. 50. 57. ES	'A5)         'CUT /         S = (         3         0.         12.         24.         33.         47.         57.         65.         73.         77.	(H $D_T = 0,$ $N_X = 0,$ $N_Y = 4$ 0. 8. 18. 32. 49. 64. 71. 78. 83. 89. Y-DVER	ASYR / 61 / 61 / 61 / 61 - /) * -	The try backs backfx $=$ -0,05 x-under 0.	X-NORMAL 0.	¥-0νεr 0.	
HASTER XLDC YLDC NLOC 10 BIN NDS 10 9 8 7 6 5 4 3 2 10 10429	8 TESTS 1 5 1 5 1 - - - - - - - - - - - - -	17 P) MAS CSSA 2 0. 0. 1. 10. 20. 26. 36. 43. 50. 57. ES	'AS)         'CUT /         'S = (         'AS)         'AS)	$ \begin{array}{c} \text{(H)} \\ \text{(F)} \\ (F$	ASYN ASYN ASYN 61 60, 1 5 0, 1 5 0, 1 5 0, 26, 49, 66, 73, 79, 85, 79, 94, 85, 90, 94, 64, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10	The try backs backfx $=$ -0,05 -0.05 x-under 0.0.	X-NORMAL0.17F+04	x-over 0.	
HASTER XLDC YLDC NLOC 10 BIN NDS 10 9 8 7 6 5 4 3 2 10 10429	8 TESTS 1 5 1 5 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	17 P) MAS CSSA 2 0. 0. 1. 10. 20. 26. 36. 43. 50. 57. ES	'A5)         'CUT /         'S = (         'A5)         'A7)         'A7)	$\begin{array}{c} H \\ P_{T} = 0, \\ N_{X} = 0, \\ N_{Y} =$	ASYM ASYM ASYM 661 661 73. 79. 85. 90. 94. AL	HETRY BACKS BACKFX $-3 + 6.10$ -0.05 x-under 0. 0.	X-NORMAL 0 17E+04 0.	E ≤ -, 3 ×-0ver 0. 0.	

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# FIGURE VIII b

1 SXFULL, BLB H67	, INDEPE 9	ENDENT,	GRID* ^Ast	5위+10XF 1처	i≠3Pt≠ ' Asyn	10PHI≉10CSA¥ HETRY CENTER	10BET*2BENDI ACCEPTANCE	4/OUT		DATE 1008	80/11
MASTER I XLOC YLOC W.DC 100	$\frac{1}{5} X = 0$	17 pi Mas	S = 0	2= ,1G (Nx-	e(160 1)*-	cntrfx -;; 3 + 6,1 Ge	$1 \leq \chi_F \leq .$	1	ay gan gan gan dan tan dali sar g	n (111 40) (24 (24 (24 (24 (24 (24 (24 (24 (24 (24	) Tayi ang gan gan gan Tay
	"Y=	Cos	x =	Ny	¥0,1	- 0.05					
BIN Nos	1	2	3	4	5						
10	0.	0. 17.	0. 25.	0. 30.	9. 30.						
7	23.	42.	50. 59.	56.	58.						
5 4 3	44. 54. 60.	64. 71. 75.	71. 75. 76.	72. 76. 79.	74. 78. 80.	<b>.</b> .					
2 1 0 10502	65. 69. Entri	79. 83. ES	80. 80.	80. 80.	80. 80.	X-UNDER	X-NORMAL	X-DVER			- ,
				Y-DVER Y-NORHA Y-UNDER	AL R	0. 0. 0.	0. .26E+04 0.	0. 0. 0.			
0 1 SXFULL BLB HGR	, INDEPI 10	ENDENT	,GRID 'AS'	=5X+10Xi YX	F⊅5PT+ ′ Asym	10PHI*10CSA	10BET+2BENDI ID ACCEPTANCE	N/OUT		DATE 100	680/
MASTER XLOC YLOC	TESTS 1 5 X= 2	17 P Mass	TCUT , 5 = (	17=,10 Nx-	Sel∕ <sup>62</sup> ∕)* 3	FRNDFX .3	$s \leq \chi_F \leq .$	7			
WLOC 10	09 V= 0	; as K	= /	Nv*	0.1-	0,05					
BIN Hos	1	2	3	- 4	5						
10 9	0. 36.	0. 47.	0. 47.	7. 46.	24. 42.						
765	63. 68.	65. 66.	67.	61. 64.	60. 64.						
5 4 3	66. 65.	71. 73.	64. 64.	64. 64.	64. 64.	•					
2 1 0. 16917	66. 66. ENTRI	73. 73. Es	64. 64.	64. 64.	64. 64.	X-UNDER	X-NORHAL	X-OVER			
				Y-OVER Y-NORH Y-UNDE	AL R	0. 0. 0.	0. _28E+04 0.	0. 0. 0.			

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# FIGURE IX a 400 GeV $P_T^s = .25$ GeV

								·				•					•
1 SXF BL8	ULL, HGR	INDEP 5	ENDENT	,GRID= 'PTV	5M#10XI /H	F*5PT* ^ PT	⊧10PHI∗ VERSUS	10CSA* Mass	10BET*	2BENDI	N/OUT				DATE	E 1206	80/
XLOC		1	Y = N	1250	- ()	Vr-	. / ) ++	3+0	6.1G	eV	•• •• •• •• •• ••						·
YLDC		3	~		- ()	v 7	~ ~ ~			•						· .	
WLCC	100	7	/= /	$P_{T} =$	= ( N <sub>3</sub>	, -1	1*3	+0	0.1 Ġ (	eV		•					
RTN				'				•								. •	
NOS		1	2	3	4	5	• • •			• • • •			· .				• •
					-					2		•					
	5	53.	55.	55.	53.	52.	×			•	÷ .						
	4	47.	51.	51.	49.	48.											
	3	41.	47.	47.	45.	45.					•			* 1	1	••••••	•
	2	35.	41.	43.	44.	44.		• .	,								
A 977	1	30. - אדהדו	37. Fr	46.	50.	53.	V	<b>B</b> ." 0	V NO	DWAL	v	DUED					
0 233	324 1	CNIKL	20		V_ALCO		N0-X	VER	טאי־ג	KNAL	۰ ۲۰	-UVER					
					V-NOCK	۸r	Λ.'		V. 12	C+04	v. 0						
					Y-HNDER	16	ν. Ω		÷۱۲ ۵	6704	0.				•		
n					I URDEI	<b>)</b>	V.		v.	•	v.					•	*
1 SXF		INDEP	ENDENT.	. GRID=	58 # 10XF	÷ ¥5PT	10PHT*	10054*	10BFT#	2BENDT	NZOUT		•		DAT	= 1204	807
BL 8	HGR	6		'CSA	VXFLP	C03	S(ALPHA	) VS X	F. PT=	.1GEV							1907
									~				~ ~ ~ ~ ~ ~ ~		······································		
MAST	ER T	ESTS	17 P	TCUT .	P_ =	0.1	GeV			•							
XLOC		2	X=	X	= 'N	* <i>0</i> ,	2 -	1-1									
YLOC		5		· F ·	" "X				0.0	5							
NFOC	100	3	Y =	0	SX =	Ny	,*0	.1-	0						•		
RTN										. •	1	•					
NOS		1	2	. 3	. 4	5	6	7	· 8	9	0		*				
1,00		•	~	Ū			Ū				Ŭ		•				
•	10	0.	0.		0.	0.	3.	0.	Ο.	0.	0.	-					
•	9	1.	2.	2.	3.	3.	26.	30.	33.	42.	45.						
	8	2.	· 4.	5.	8.	10.	38.	44.	45.	46.	51.					•	
	7	4.	7.	11.	18.	26.	47.	46.	48.	55.	66.		-				
	6	8.	14.	25.	36.	42.	49.	48.	55.	69.	76.						
	5	19.	25.	36.	45.	51.	50.	55.	68.	78.	83.						
	4	25.	36.	43.	54.	59.	54.	60.	78.	84.	86.						
	3	34.	43.	52.	60.	67.	59.	77.	86.	86.	86.	•					
	2	41.	47.	56.	63.	73.	72.	85.	86.	86.	86.						
	1	45.	55.	62.	70.	79.	81.	87.	86.	87.	87.	-					
0 43	/25	ENTRI	ES		V 01100		X-UN	DEX	X-N0	KMAL	X	-OVER					
					I-UVER	<b>N I</b>	`.0		۷.	C104	.0.						
					T-RUKAN Y-HNDER	4L 2	0. 0		.44 0	C7V4	υ. Δ						
Ð					1 010066	•	v .		v.		ν.			•			•
-																	

-18-

-19-FIGURE IX b

400 GeV  $P_{T}^{s} = .25 \text{ GeV}$ 

918 NGR	15		BEAC	AMPT 1	B	ETA VS	COSA A	CCEPT	ANCE IN	1/001 1 Gamma 	CON			DAIE	
HASTER	TESTS	52 L(	MASS/	1=6,1	9.156	FORUD	XF.	70	58 MIDA	TP7	= 6,	16.	eV		
XLUU YLOC	1	X = C	asa	- 1/		01-	n nc	<b>-</b>					۰.		
- 1600 - 9102 - 10	05	~ - 0		-//	$\chi \wedge c$	511-0	1,05								
	-	Y = 1	5 = /	Ny,	* 01	- 0,0	)5))	$\epsilon \pi / \epsilon$	<b>د</b>					•	
BIN		<i>(</i>	Ľ		•			7 5	• .	1			,		· •
NOS	1	2	3	4	. 5	5	7	8	9	0				• .	
									_						
10	82.	86.	90.	86.	83.	79.	70.	56.	39.	8.					
9	. 79.	84.	82.	82.	8/.	83.	/2.	59.	43.	15.					
8	79.	80.	/9.	81.	81.	79.	/3.	5/.	42.	1/.		•			,
7	77.	79.	78	//.	/5.	/1.	/6.	60.	45.	20.					
6	74.	74.	77.	75.	/5.	72.	6/.	68.	45.	23.					
5	71.	72.	73.	75.	70.	68.	69.	68.	48.	24.					
-7	70.	70.	72.	68.	67.	<u> 46.</u>	65.	66.	53.	27.					*
3	69.	67.	65.	65.	64.	65.	64.	64.	52.	24.					
2	65.	63.	56.	59.	58.	62.	61.	70.	58.	28.					
	61.	48.	47.	53.	58.	64.	69.	76.	71.	30.					
12765	ENTRI	ES				X-UNI	DER	X-NO	RMAL	χ-	-OVER				
			۱	-OVER		0.		0.		0.		>			
			. )	-NCRM	AL 22	0.		64	E+04	0.	•				
			Y	-UNDER	?	0.		0.		Q.					· •
Lt L															
I SXFULL Blg Hor	,INDEP 16	ENDENT	,GRID=5 'BEVC	SM#10XI Cahpt	**5PT* ′ B	10PHI* ETA VS	IOCSA* Cosa i	IOBET≉ ACCEPT	2BENDI ANCE I	N/OUT N GAMM	A COM			DATE	E 120680
I SXFULL BLO HOA NASTER	, INDEP 16 TESTS	ENDENT 52 Li	,GRID=S 'BEVC DMASS	5M#10XF AHPT 1=6.]	*5PT* B 9./56	10PHI* ETA VS FORUD	10CSA* COSA X=7	ACCEPT	2BENDI ANCE I 57 HIP	N/OUT N GAMMI T P= =	a com = 12,	IG «	eV	DATE	E 120680
I SXFULL BLG HGA NASTER XLDC	, INDEP 16 TESTS 5	ENDENT 52 LI X = 0	, GRID=5 'BEVC OMASS COS X	$\frac{1}{4} = 6.1$	×5F1* B ,9./56 V x *	10PHI* ETA VS FORUD	$X_{F}$	ACCEPT	2BENDI ANCE I 59 HIP	N/OUT N GAMMA T P= :	a com = 12,	16	eV	DATE	120680
SXFULL BL8 H05 MASTER XL0C YL0C	TESTS	ENDENT 52 LI $\chi = 0$	,GRID=5 'BEVC OMASS COS &	$\frac{1}{1 = G \cdot I}$	=*5PT* Β ,9./56 Vα ★	10PHI* ETA VS FORWD - <i>O</i> , / -	$\chi_{F}$	ACCEPT	2BENDII ANCE I 57 HIP	N/OUT N GAMMI T P <sub>2</sub> :	a com = 12,	IGe	eV	DATE	E 120680
I SXFULL BLB H37 Master XLDC YLOC WLCC 10	., INDEP 16 TESTS 5 6 005	ENDENT 52 L t $\chi = 0$ $\chi = 0$	, GRID=5 'BEVC DMASS COS & B = /	5M*10XI CAHPT 1=G.J = = /	×5PT* B , 9./56 V x × × 0./	10PHI* ETA VS FORWD - 0,/-	$\chi_{F}$		2BENDI ANCE I 57 HIP	N/OUT N GAMM T Pg =	a com = 12,	16	eV	DATE	120680
SXFULL BL8 H97 MASTER XL0C YL0C WL0C 10 BTN	., INDEP 16 TESTS 5 6 005	ENDENT 52 L t $\chi = 0$ $\chi = 1$	, GRID=5 'BEVC DMASS COS & COS &	$f = G \cdot I$ $f = G \cdot I$ $V = I$	×5PT* 8 9./56 V x × × 0./	10PHI* ETA VS FORUD - 0,/-	(054 (054) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7		2BENDI ANCE I 57 HIP	N/OUT N GAMMI T P- :	a com = 12,	16	eV	BATE	120680
SXFULL BLG HOR NASTER XLOC YLOC WLOC TO BIN NGS	, INBEP 16 TESTS 5 6 005	ENDENT 52  LM $\chi = 0$ $\chi = 1$ 2	, GRID=5 'BEVC DMASS/ COS & B = (	$f(A+1) = G \cdot f(A+PT) + f$	×5FT* 8 9./56 V x × × 0./	10PHI* ETA VS FORUD - 0, / - - 0, 0	10CSA* COSA   СОSA   () СОSA   () СОSА   () ССА   () СОSА   () СОSА   СОSА   () СОSА   () СССА		2BENDIA ANCE I 57 HIP 2	N/OUT N GAMMI T P- =	a com = 12,	16	e V	BATE	<b>12068</b> 0
SXFULL BLG HGA NASTER XLOC YLOC WLCC 10 BIN HOG	, INBEP 16 TESTS 5 6 005	ENDENT 52 L C $\chi = 0$ $\chi = 1$ 2	, GRID=5 'BEVC DMASS/ COS × B = (. 3	$\frac{1}{M+10XF}$ $\frac{1}{A+PT} = 6 \cdot \frac{1}{M}$ $\frac{1}{M} = \frac{1}{M}$ $\frac{1}{M}$ $\frac{1}{M}$	×5FT* 8 9,/56 V x × × 0,/ 5	10PHI* ETA VS FORWD - 0, / - - 0, 6	10CSA* COSA ( ),03 (),03 (),0) (),03 ()) (),03 (),03 ()) (),03 ()) (),03 ()) (),03 ()) (),03 ()) (),03 ()) ())(),03 ())())())())())())())()())()()	10BET* ACCEPT 0 5 + 77/2 8	2BENDII ANCE I 57 HIP 2 9	N/OUT N GAMM T P- = 1 0	a com = 12,	IG	eV	BATE	<b>12068</b> 0
SXFULL BLG HGA NASTER XLOC YLOC WLCC 10 BIN NOS	, INBEP 16 TESTS 5 6 005 1 85-	ENDENT 52  L $\chi = 0$ $\chi = 1$ 2 90	, GRID=5 'BEVC DMASS/ COS & B = ( 3 85-	$\frac{1}{1} = G \cdot \frac{1}{2}$ $\frac{1}{1} = G \cdot \frac{1}{2}$ $\frac{1}{1} = G \cdot \frac{1}{2}$ $\frac{1}{1} = \frac{1}{2}$ $\frac{1}{2} = \frac{1}{2}$ $\frac{1}{2} = \frac{1}{2}$	×5PT* 8 9,/56 V x × × 0,/ 5 87-	10PHI* ETA VS FORWD - 0, / - - 6 88.	$\begin{array}{c} 10CSA \\ COSA \\ \hline \\ $	10BET ACCEPT → O → → → → → → → → → → → → →	2BENDI ANCE I 57 HIP 2 9 43-	N/OUT N GAMM T P- = 1 0 12.	a com = 12,	16	eV	BAT5	<b>12068</b> 0
SXFULL BLG HGA NASTER XLOC YLOC WLCC 10 BIN NOS 10 9	., INBEP 16 TESTS 5 6 005 1 85. 86.	ENDENT 52 Lt $\chi = 0$ $\chi = 1$ 2 90. 82.	, GRID=5 'BEVC DMASS COS X B = ( 3 85. 85.	n = 10XF $n = 6.1$ $n = 6.1$ $N = 7$ $4$ $85.$ $85.$	×5FT* 8 9,/56 V x × × 0,/ 5 87. 87.	10PHI* ETA VS FORWD - 0,/- 6 88. 87.	(0CSA + COSA +	108ET ACCEPT → O → → → → → → → → → → → → →	2BENDI ANCE I 57 HIP 2 9 43. 46	N/OUT N GAMM T P = 1 0 12. 17.	a com = 12 ,	16	e /	BATE	<b>12068</b> 0
SXFULL BL8 H37 MASTER XL0C YL0C WL0C 10 BIN N0S 10 7 2	, INBEP 16 TESTS 5 6 005 1 85. 86. 83.	ENDENT 52 LP $\chi = 0$ $\chi = 1$ 2 90. 87. 83	, GRID=5 'BEVC DMASS COS COS COS COS COS COS COS COS COS C	$f = G \cdot f$ $f = $	×5FT* 8 9./56 V x × × 0./ 5 87. 87. 88	10PHI* ETA VS FORUD - 0,/- 6 88. 87. 89.	(0) = (0)	108ET ACCEPT → O → → → → → → → → → → → → →	2BENDI ANCE I 57 HIP 2 9 43. 46. 50.	N/OUT N GAMM T P = 1 0 12. 17. 20.	a com = 12,	16	eV	BATE	<b>12068</b> 0
SXFULL BLG HGA NASTER XLOC YLOC WLCC 10 BIN NOS 10 7 2	, INDEP 16 TESTS 5 005 1 85. 85. 85. 83. 80	ENDENT 52 Lf $\chi = 0$ $\chi = 1$ 2 90. 87. 83. 93.	$\mathcal{B} = ($	$A = G \cdot J$ $A = G \cdot J$ A =	×5FT* <i>8</i> , <i>9</i> , <i>1</i> , 56 <i>1</i> , <i>x</i> , <i>x</i> <i>x</i> , <i>o</i> , <i>1</i> <i>x</i> , <i>x</i> , <i>x</i> <i>x</i> , <i>x</i> , <i>x</i> , <i>x</i> , <i>x</i> <i>x</i> , <i>x</i> , <i>x</i> , <i>x</i> <i>x</i> , <i>x</i> , <i>x</i> , <i>x</i> , <i>x</i> <i>x</i> , <i>x</i> , <i>x</i> , <i>x</i> , <i>x</i> <i>x</i> , <i>x</i> ,	10PHI* ETA VS FORUD - 0,/- - 0,0 6 88. 87. 88. 87. 88. 87. 88.	(0CSA + COSA +	108ET ACCEPT → O → → → → → → → → → → → → →	2BENDI ANCE I 57 HIP 2 9 43. 45. 50. 59	N/OUT N GAMM T P = 1 0 12. 17. 20. 21	a com = 12 ,	16	eV	BATE	<b>12068</b> 0
SXFULL BL8 H07 NASTER XL0C YL0C WL0C 10 BIN N03 10 9 2 7 2	, INDEP 16 TESTS 5 005 1 85. 85. 85. 80. 80.	ENDENT 52 Lf X = 0 Y = 1 2 90. 87. 83. 83. 83. 83.	, GRID=5 'BEVC DMASS/ COS B S S S S S S S S S S S S S S S S S	A = G. A = G. B = G. A =	×5FT* <i>8</i> , <i>9</i> , <i>/</i> 56 <i>X x ×</i> <i>X ×</i> <i>X ×</i> <i>x 0, /</i> 5 87. 87. 87. 88. 86. 86.	10PHI* ETA VS FORUD - 0, / - - 0, ( 6 88. 87. 89. 87. 87. 84	$\begin{array}{c} 10CSA \\ COSA \\ COSA \\ \end{array}$ $\begin{array}{c} 7 \\ 0, 0 \\ 0, 0 \\ 0, 0 \\ 0, 0 \\ 0, 0 \\ 0, 0 \\ 0, 0 \\ 0, 0 \\ 0 \\$	10BET ACCEPT → 0 → 11/2 8 72. 79. 83. 83. 83.	2BENDI ANCE I 57 HIP 2 43. 46. 50. 59.	N/OUT N GAMM T P- = 1 0 12. 17. 20. 21. 20	a com = 12,	16	εV	BATE	<b>12068</b> 0
SXFULL BLG HGA NASTER XLOC YLOC WLOC 10 BIN NOS 10 7 2 7 6	, INDEP 16 TESTS 5 6 05 1 85. 83. 83. 80. 80. 20	ENDENT 52 L X = 0 Y = 1 2 90. 87. 83. 83. 83. 81. 91.	, GRID=5 'BEVC DMASS COS	M = 10XI AHPT =	×5FT* 87. 87. 87. 88. 84. 84.	10PHI* ETA VS FORUD - 0, / - - 0, 6 88. 87. 88. 87. 88. 87. 88. 87. 88.	$\begin{array}{c} 10CSA \\ COSA \\ COSA \\ \hline \end{array}$	108ET ACCEPT → 0 → 77/2 8 72. 79. 83. 83. 80. 70. 70. 83. 80. 70.	2BENDIA ANCE I 57 HIP 2 43. 46. 50. 59. 68. 47	N/OUT N GAMM T P- = 1 0 12. 17. 20. 21. 20. 19	a com = 12,	16	e V	BATE	<b>12068</b> 0
I SXFULL BLA HOR NASTER XLOC YLOC WLCC 10 BIN NOS 10 7 6 5	, INDEP 16 TESTS 5 6 005 1 85. 85. 83. 80. 80. 80. 78. 74	ENDENT 52 L X = 0 Y = 1 2 90. 87. 83. 83. 81. 81. 20	, GRID=5 'BEVC DMASS/ COS X B = ( 3 85. 85. 85. 85. 84. 83. 82.	M = 10XI AHPT f = G.J f = G.J N = f N = f S =	×5FT* 87. 87. 87. 88. 84. 84. 84.	10PHI* ETA VS FORUD - 0,/- - 0, 6 88. 87. 88. 87. 88. 87. 88. 86. 86.	(0CSA*) (0SA)	10BET ACCEPT → 0 → 77/2 8 72. 79. 83. 83. 83. 80. 78. 77.	2BENDIA ANCE I 57 HIP 2 43. 46. 50. 59. 68. 67.	N/OUT N GAMMA T Pr = 1 0 12. 17. 20. 21. 20. 19. 22	a com = 12,	1 G e	e V	BATE	<b>12068</b> 0
SXFULL BLG HGA NASTER XLOC YLOC WLCC 10 BIN NOS 10 7 6 5 4	, INDEP 16 TESTS 5 6 005 1 85. 85. 83. 80. 80. 80. 78. 76. 72	ENDENT 52 LU X = 0 Y = 1 2 90. 87. 83. 83. 81. 79. 20	, GRID=5 'BEVC DMASS/ COS & B = ( 3 85. 85. 85. 86. 84. 83. 82. 81. 70	M = 10XI AHPT AHPT A = 0.1 N =	×5FT* 8, 9, / 56 V x × × 0, / 5 87. 87. 88. 84. 84. 84. 84. 84. 82.	10PHI* ETA VS FORUD - 0, / - - 0, 6 88. 87. 88. 87. 88. 87. 88. 87. 88. 87. 88. 87. 88. 87. 86. 86. 82.	(0CSA*) (0SA)	108ET ACCEPT → 0 → 77/2 8 72. 79. 83. 83. 83. 80. 78. 77.	2BENDI ANCE I 57 HIP 2 43. 45. 50. 59. 68. 67. 64.	N/OUT N GAMMA T P- = 1 0 12. 17. 20. 21. 20. 19. 22.	a com = 12 ,	16	e V	BAT5	<b>12068</b> 0
I SXFULL BLG H3A NASTER XLDC YLOC ULCC 10 BIN NOS 10 7 6 5 4 3 3	, INBEP 16 TESTS 5 6 005 1 85. 85. 85. 80. 80. 80. 78. 76. 77.	ENDENT 52 LV X = 0 Y = 1 2 90. 87. 83. 83. 81. 79. 78. 78.	, GRID=S 'BEVC DMASS OMASS COS S S 85. 85. 85. 85. 85. 85. 85. 85. 85. 85.	M = 10XI AHPT AHPT A = 0.1 N = 0.1 N = 0.1 N = 0.1 A =	×5FT* B 9/56 V X X X 0,/ 5 87. 87. 88. 84. 84. 84. 84. 84.	10PHI* ETA VS FORUD - 0, / - - 0, 6 88. 87. 87	(0CSA*) (COSA) (CO	108ET ACCEPT → → → → → → → → → → → → →	2BENDI ANCE I 57 HIP 2 9 43. 46. 59. 68. 67. 64. 57.	N/OUT N GAMMA T P = 1 0 12. 17. 20. 21. 20. 19. 22. 24. 25	a com = 12 ,	16	e V	BATE	<b>12068</b> 0
I SXFULL BLG H3A NASTER XLDC YLOC ULCC 10 BIN NOS 10 7 6 5 4 3 2 2	, INBEP 16 TESTS 5 6 005 1 85. 85. 85. 80. 80. 78. 76. 77. 78.	ENDENT 52  LV $\chi = 0$ $\chi = 0$ $\chi = 0$ 2 90. 87. 83. 83. 81. 79. 78. 81. 29. 81. 29. 81. 81. 29. 81.	, GRID=5 'BEVC  DMASS COS S S S S S S S S S S S S S S S S S	M = 10XI AHPT AHPT A = 6.1 A = 7 A = 7	×5FT* <i>8</i> , <i>7</i> , <i>7</i> , <i>5</i> , <i>7</i>	10PHI* ETA VS FORUD - 0,/- - 0,0 88. 87. 88. 87. 86. 86. 82. 83. 82. 83. 82.	(0CSA*) (COSA) (CO	10BET ACCEPT → → → → → → → → → → → → →	2BENDI ANCE I 57 HIP 2 9 43. 45. 50. 59. 68. 67. 64. 57. 47.	N/OUT N GAMMA T P = 1 0 12. 17. 20. 21. 20. 19. 22. 24. 25.	a com = 12 ,	16	e V	BATE	<b>12068</b> 0
I SXFULL BLG HGA HASTER XLDC YLOC IC BIN NOS 10 7 6 5 4 3 2 1	, INBEP 16 TESTS 5 6 005 1 85. 86. 83. 80. 80. 78. 78. 77. 78. 79.	ENDENT 52 L $\chi = 0$ $\chi = 0$	, GRID=5 'BEVC DMASS DMASS () () () () () () () () () () () () ()	M = 10XI $A = G \cdot J$ $A = G \cdot J$ A =	*5FT* <i>8</i> /56 <i>X X X</i> <i>X X</i> <i>X</i> <i>X</i> <i>X</i> <i>X</i> <i>X</i> <i>X</i> <i>X</i> <i>X</i> <i>X</i> <i>X</i>	10PHI* ETA VS FORUD - 0,/- - 0, 6 88. 87. 88. 87. 86. 86. 82. 83. 82. 72.	(0CSA*) (COSA) (CO	108ET ACCEPT ACCEPT C C C C C C C C C C C C C	2BENDI ANCE I 57 HIP 2 9 43. 45. 50. 59. 68. 67. 64. 57. 47. 48.	N/OUT N GAMMA T P- = 1 0 12. 17. 20. 21. 20. 19. 22. 24. 25. 31.	a com = 12,	16	εV	BATE	<b>12068</b> 0
I SXFULL BLA HOR NASTER XLDC YLOC IC BIN NOS 10 9 2 5 4 3 2 1 1 3 2 1 1 3 2 1 1 3 2 1 1 3 2 1 3 1 3	, INBEP 16 TESTS 5 6 005 1 85. 86. 83. 80. 80. 28. 76. 77. 78. 79. 5 ENTRI	ENDENT 52  LM X = 0 Y = 0 Y = 0 2 90. 87. 83. 83. 83. 81. 79. 78. 81. 81. 81. 83. 81. 81. 83. 81. 81. 83. 81. 81. 83. 81.	, GRID=5 'BEVC DMASS DMASS COS S 3 85. 85. 85. 85. 85. 85. 85. 85. 85. 85.	M = 10XI $A = G \cdot J$ $A = G \cdot J$ A =	*5FT* <i>9</i> /56 <i>X X</i> <i>X X</i>	10PHI* ETA VS FORUD - 0, / - - 0, 6 88. 87. 88. 87. 86. 82. 83. 82. 83. 82. 72. X-UN	(0 C S A * C O S A + C O	10BET ACCEPT ACCEPT C C C C C C C C C C C C C	2BENDI ANCE I 57 HIP 2 9 43. 46. 50. 59. 68. 67. 64. 57. 48. RMAL	N/OUT N GAMMA T P- = 1 0 12. 17. 20. 21. 20. 17. 22. 24. 25. 31. X	-OVER	16	eV	BATE	E 120680
I SXFULL BLA HOR NASTER XLDC YLOC IC BIN NOS 10 9 2 3 4 3 2 1 3 1 4 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 3 2 1 3 3 2 1 3 3 2 1 3 3 3 2 1 3 3 3 3	, INDEP 16 TESTS 5 6 005 1 85. 83. 80. 80. 80. 78. 77. 78. 79. 5 ENTRI	ENDENT 52 LU X = 0 Y =	, GRID=5 'BEVC DMASS DMASS COS S 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	M = 10XI $A = G \cdot J$ $A = G \cdot J$ A =	×5FT* 87. 87. 87. 87. 88. 84. 84. 84. 84. 84. 85.	10PHI* ETA VS FORUD - 0, / - - 0, 6 88. 87. 88. 87. 88. 87. 86. 82. 83. 82. 72. X-UN 0.	(0 C S A * C O S A + C O	10BET ACCEPT ACCEPT C C C C C C C C C C C C C	2BENDI ANCE I 57 HIP 2 43. 46. 50. 59. 68. 67. 64. 57. 48. RMAL	N/OUT N GAMMA T Pr = 1 0 12. 17. 20. 21. 20. 21. 20. 17. 22. 24. 25. 31. X. 0.	-OVER	16	e V	BATE	<b>12068</b> 0
1 SXFULL BL8 H35 MASTER XLBC YLDC WLCC 10 BIN NC3 10 7 6 5 4 3 2 2 1 0 - 14363	, INDEP 16 TESTS 5 6 005 1 85. 85. 83. 80. 80. 78. 78. 77. 78. 79. 5 ENTRI	ENDENT 52 LU X = 0 Y = 1 2 90. 87. 83. 83. 81. 79. 78. 81. 81. ES	, GRID=5 'BEVC DMASS DMASS COS S 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	M # 1 0 X   A H P T A = G. A = A A = A	$ \begin{array}{c}                                     $	10PHI* ETA VS FORUD - 0, / - - 0, 6 88. 87. 88. 87. 88. 87. 88. 82. 83. 82. 72. X-UN 0. 0.	(0 C S A * C O S A + C O	10BET* ACCEPT ACCEPT 8 72. 79. 83. 83. 80. 78. 74. 65. 40. X-NO 0. .73	2BENDIA ANCE I 57 HIP 2 43. 46. 50. 59. 68. 67. 64. 57. 48. RMAL E+04	N/OUT N GAMMA T Pr = 1 0 12. 17. 20. 21. 20. 21. 20. 19. 22. 24. 25. 31. X: 0. 0.	-OVER	16	e V	BATE	<b>12068</b> 0

# FIGURE IX C

# 400 GeV $P_{T}^{S} = .25 \text{ GeV}$

BL6 HG	L,INDEF R 12	PENDENT	,GRID=	=5h*10x /Campt	F*5PT* * P	*10PHI≉ SETA VS	10CSA‡ COSA	10BET* ACCEPT	2BENDI ANCE I	N/OUT N GAMMA CC	n		BATE 120680/
NASTER XLOC YLOC WLOC 1	TESTS 5 6 005	52 L	omass, Cos	M=6.1 ≪ = Л	, 9,155 1 χ <del>×</del>	5 BACK - <i>0,1</i> –	X <sub>F</sub> < 0,0	5	58 MID	PT P=	6,1Ge	V	
ЪТА		y=	<i>\</i> ₿ =	= (N	'y*c	0.1-0	0,05	-)*-	$M_2$				
NOS	1	2	3	4	5	5	7	8	9	1 0		•	
10	34.	33.	36.	35.	34.	33.	31.	28.	23.	22.			
9	35.	35.	36.	35.	34.	32.	31.	28.	25.	23.			•
8	34.	37.	36.	37.	37.	34.	31.	29.	25.	23.			
7	33.	35.	35.	38.	35.	35.	34.	29.	25.	23.			
6	27.	30.	30.	33.	33.	33.	34.	30.	24.	22.			
5	15.	18.	22.	25.	26.	28.	29.	31.	26.	21.		•	
4	10.	10.	16.	19.	19.	23.	23.	27.	27.	19.			
3	6.	11.	12.	13.	16.	17.	22.	24.	25.	19.			
2	2.	7.	8.	9.	15.	16.	19.	20.	21.	19.			
1	0	3.	7.	8.	11.	14.	15.	16-	15.	17.			
0 434	7 ENTRI	ES	••	01		X-11N	RFR	- Y-NO	RMAI	Y-OUF	<b>P</b> -		
U 101				Y-DUER		0.	<i></i>	0 N		0	0		
				Y-NORM	A I	<u>.</u>		v. วง	E704	0			
				<u>រ កណ្ដូ</u> ការ V_អតីតក	<u>.</u>	Δ			L1V7	0	.•		
1 SXFUL BL8 HG	L.INDEP	ENDENT	GRID=	5M*10X	*5PT*	16PHT*	10034#	1 ABCTA	POFNAT	11 70117			<b>NATE 120480</b>
	K 13		'BE\	CAHPT	B	ETA VS	COSA	ACCEPT	ANCE I	N GAMMA CO	M		
NASTER Xloc	N 13 TESTS 5	52 L	'BEN  DMASS/	M=6.1	B 197./55	ETA VS BACK	cosa X <sub>F</sub> <	ACCEPT	ANCE I 59 HIP	N GANNA CO T $P_T = G$ .	H IGel	/	
NASTER Xloc Yloc	TESTS 5 6	52 L	<sup>-</sup> Bev DMASS, <i>Cos</i>	$M = 6 \cdot 1$	в 1,9,/55 МУУЭ	ETA VS BACK	COSA X=- - 0,	ACCEPT	ANCE I 59 HIP	N GANNA CO T $P_T = G$	H IGel	/	
NASTER Xloc Yloc Vloc 1	13 TESTS 5 6 305	52 L	BEN DHASS, COS	$M = G_{ij}$	в /9./55 МУУЭ		COSA X=L - 0,	ACCEPT	ANCE I 59 HIP	N GANNA CO T $P_{T} = G$	H IGel	/	
NASTER XLOC YLOC WLOC 1	N 13 TESTS 5 6 005	$\begin{array}{c} 52 \\ \chi = \\ \chi = \end{array}$	-BEN OMASS, COS = B	M = 6 m	B 19./55 Ny 3 1y <del>X</del>	ETA VS BACK C, 1 -	COSA X= 4 - 0, 0	0 0 0 0 5 )*	ANCE I 59 HIP	N GAMMA CO T $P_{T}=6$	n IGel	/	
NASTER XLOC YLOC WLOC 1 BIN	N 13 TESTS 5 6 005	x =	-bev omass, <i>Cos</i> = B	M = 6 m	8 19./55 Ny 3 1y <del>x</del>	ETA VS BACK $\leftarrow O, /$ o, / -	COSA X=2 - 0, 0 0,05	0 0 0 5 )*	ANCE I 59 HIP	N GAMMA CO T $P_T = G$	n IGel	/	
NASTER XLOC YLOC WLOC 1 BIN NOS	N 13 TESTS 5 6 305	$\begin{array}{c} 52 \\ \chi = \\ \chi = \\ 2 \end{array}$	-bev omass, <i>Cos</i> = <i>B</i> 3	$M = 6 \cdot 1$ $M = 6 \cdot 1$ $= (N)$ $= (N)$ $= 4$	b 9./55 Vy 3 Y <del>X</del> 5	ETA VS BACK C, / O, / -	COSA XFL - 0, 0 0,05 7	0 0 5 5 8	#/2 #/2	N GAMMA CO T $P_T = G$	n IGeb		
NASTER XLOC YLOC WLOC 1 BIN NOS	N 13 TESTS 5 6 205 1	$\begin{array}{c} 52 \\ \mathcal{X} = \\ \mathcal{Y} = \\ 2 \\ 10 \\ 10 \\ 2 \\ 10 \\ 10 \\ 10 \\ 10 \\$	1BEV DHASSS/ COS = B 3	$M = 6 \cdot 1$	y9./55 Vy3 y <del>x</del> 5	ETA VS BACK C, / O, / - 6	COSA X= 4 - 0, 0 0,05 7	accept os s s s s	ANCE I 59 HIP	N GAMMA CO T $P_T = G$	n IGel		
NASTER XLOC YLOC ULOC 1 BIN NOS	13 TESTS 5 6 205 1 37.	$\begin{array}{c} 52 \\ \chi = \\ \chi = \\ 2 \\ 40. \\ 72 \end{array}$	-1BEV DHASSS/ COS = B 3 40.	$M = 6 \cdot 1$ $M = 6 \cdot 1$ $S = 1$ $= (N)$ $4$ $40.$	y 7./55 Vy 3 y <del>x</del> 5 41.	ETA VS BACK $\leftarrow O, /$ o, / - $_{6}$ $_{38}$ .	COSA X= < - 0, 0 0,05 7 37.	COEFT ACCEPT 05 5)★ 8 34.	ANCE I 59 HIP 7/2 9. 28.	$\frac{1}{16}$	H IGel		
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9	N 13 TESTS 5 6 005 1 39. 38.	52 L $\chi = -\frac{\chi}{2} = -\frac{2}{2}$ 40. 38.	- BEV DHASS <i>Cos</i> = <i>B</i> 3 40.	$M = 6 \cdot 1$ $M = 6 \cdot 1$ $S \ll = 1$ $= (N)$ $4$ $40.$ $41.$	$y = \frac{1}{2}$	ETA VS BACK Co, / O, / - 6 38. 41.	COSA X= < - 0, 0 0, 0 ≤ 7 37. 40.	ACCEPT 05 5)* 8 34. 36.	ANCE I 59 HIP #/2 9. 28. 32.	$\frac{1}{16.}$	H IGel	· · · · · · · · · · · · · · · · · · ·	
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8	N 13 TESTS 5 6 005 1 39. 38. 39.	52 L $\chi =$ $\chi =$ 2 40. 38. 37.	-BEV DMASS <i>Cos</i> = <i>B</i> 3 40. 38.	M = 6 m $M = 6 m$ $M =$	$   \begin{array}{c}         B \\         9./55 \\         \sqrt{y} \\         \sqrt{y} \\         \sqrt{y} \\         \sqrt{y} \\         5 \\         41. \\         42. \\         40. \\         7         \end{array} $	ETA VS BACK Co, / Co, / 6 38. 41. 42.	COSA X= 4 - 0, 0 0, 05 7 37. 40. 42.	accept 05 5)* 8 34. 36. 40.	ANCE I 59 HIP 7/2 9- 28. 32. 33.	$\begin{array}{c} 1 \\ R \\$	H IGel	/	
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8 7	TESTS 5 6 005 1 39. 38. 39. 37.	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36.	-BEU DMASS COS = B 3 40. 38. 38.	M = 6 m M = 6 m	$ \begin{array}{c}     B \\     \hline         } \\         } \\         } \\         $	ETA VS BACK Co, / Co, / 6 38. 41. 42. 40.	COSA X= 4 - 0, 0 -	C C C C C C C C C C C C C C	#NCE I 59 HIP #/2 28. 32. 33. 39.	$\begin{array}{c} 1 \\ R \\ T \\ P_T = 6 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 $	H IGel	/	
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8 7 6	13 TESTS 5 6 305 1 39. 39. 37. 37. 37.	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36. 36. 36.	-BEU DMASS, COS = B 3 40. 40. 38. 38. 35.	M = 6 m $M = 6 m$ $M =$	$ \begin{array}{c}     B \\     \hline     9,/55 \\     \overline{} \\      \overline{} \\     \overline{} \\           \overline{} \\            \overline{} \\             \overline{} \\             \overline{} \\                  \overline{} \\                                   $	ETA VS BACK C, / C, / C, / BACK C, / 6 38. 41. 42. 40. 37.	$\begin{array}{c} cosa \\ cosa \\ x_{f} < \\ -o, \\ o, o \\ \\ 0, o \\ \\ 0, o \\ \\ 7 \\ 37. \\ 40. \\ 42. \\ 41. \\ 40. \end{array}$	C C C C C C C C C C C C C C	ANCE I 59 HIP 7/2 28. 32. 33. 39. 38.	$\begin{array}{c} 1 \\ R \\$	H IGel		
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8 7 6 5	13 TESTS 5 6 305 1 39. 37. 37. 38. 37. 38.	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36. 36. 34. 34.	-BEU OMASS, COS = B 3 40. 40. 38. 38. 35. 33.	M = 6 m $M = 6 m$ $M =$	$ \begin{array}{c}     B \\     \hline         } \\         } \\         } \\         $	ETA VS BACK C, / O, / - 6 38. 41. 42. 40. 37. 37.	$\begin{array}{c} cosa \\ \hline X_{f} < \\ - 0, 0 \\ 0, 0 \\ \hline \\ 7 \\ \hline \\ 37. \\ 40. \\ 41. \\ 40. \\ 41. \\ \hline \\ 1. \\ \hline \end{array}$	COS COS COS COS B 34. 36. 40. 44. 43. 43.	ANCE I 59 HIP 7/2 28. 32. 33. 39. 38. 41.	$\begin{array}{c} 1 \\ R \\$	H IGel		
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8 7 6 5	13 TESTS 5 6 305 1 39. 37. 37. 38. 35.	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36. 36. 34. 33.	-BEU OMASS, Cos = B 3 40. 40. 38. 38. 35. 33. 32.	M = 6 M $M = 6 M$ $M =$	$ \begin{array}{c}     B \\     \hline         \\         \\         \\         $	ETA VS BACK Co, / Co, / - 6 38. 41. 42. 40. 37. 37. 36.	COSA X= - 0, 0 - 0,	CONTRACCEPT CONTRACTOR CONTR	ANCE I 59 HIP 7/2 28. 32. 33. 39. 38. 41. 43.	$\begin{array}{c} 1 \\ R \\$	H IGel		
NASTER XLOC YLOC 1 ULOC 1 BIN NOS 10 9 8 7 6 5 4 3	13 TESTS 5 6 005 1 39. 39. 37. 37. 37. 38. 35. 31.	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36. 36. 34. 33. 33. 33.	-BEV DMASS COS = B 3 40. 40. 38. 38. 35. 33. 32. 31.	M = 6 M $M = 6 M$ $M =$	$ \begin{array}{c}     B \\     B \\     \hline         \\         \\         \\         $	ETA VS BACK Co, / - 6 38. 41. 42. 40. 37. 35. 35.	$\begin{array}{c} cosa \\ cosa \\ x = < \\ 0, 0 \\ 0$	ACCEPT	ANCE I 59 HIP 59 HIP 7/2 28. 32. 33. 39. 38. 41. 43. 44.	$\begin{array}{c} 1 \\ R \\ GAMMA \\ CO \\ T \\ P_{T} = G \\ 0 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 18 \\ 19 \\ 17 \\ 17 \\ 17 \\ \end{array}$	H IGel		
NASTER XLOC YLOC 1 ULOC 1 BIN NOS 10 9 8 7 6 5 4 3 2	13 TESTS 5 6 005 1 39. 37. 37. 37. 37. 38. 35. 31. 27.	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36. 36. 34. 33. 31. 31.	1BEV DMASS COS COS COS COS COS COS COS COS COS C	M = 6 M $M = 6 M$ $M =$	$\begin{array}{c} & & & \\ & &$	ETA VS BACK C, / C, / BACK C, / BACK C, / 6 38. 41. 42. 40. 37. 37. 35. 34.	$\begin{array}{c} cosa \\ cosa \\ x = \\ cosa \\ x = \\ cosa \\ cosa$	ACCEPT	ANCE I 59 HIP 7/2 28. 32. 33. 39. 38. 41. 43. 44. 42.	$\begin{array}{c} 1 \\ R \\ GAMMA \\ CO \\ T \\ P_{T} = 6. \\ 16. \\ 16. \\ 16. \\ 16. \\ 18. \\ 19. \\ 17. \\ 15. \\ \end{array}$	H IBel		
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8 7 6 5 4 3 2 1	13 TESTS 5 6 005 1 39. 37. 37. 37. 37. 37. 38. 35. 31. 27. 23.	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36. 36. 34. 33. 31. 27.	1BEV DMASS COS COS COS COS COS COS COS COS COS C	M = 6 $M = 6$ $M =$	$\begin{array}{c} & & B \\ & & B \\ & & & B \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & &$	ETA VS BACK Co, / Co, / BACK Co, / 6 38. 41. 42. 40. 37. 37. 35. 34. 34. 34.	COSA COSA X= < - 0, 0 - 0,	COLETA ACCEPT CONSCIENT CONSCIENT CONSCIENT COLETA	ANCE I 59 HIP 7/2 28. 32. 33. 39. 38. 41. 43. 44. 42. 37.	$\begin{array}{c} 1 \\ R \\ GAMMA \\ CO \\ T \\ P \\ = 6 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 18 \\ 19 \\ 17 \\ 17 \\ 15 \\ 16 \\ 16 \\ \end{array}$	H IGel		
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8 7 6 5 4 3 2 1 0 599	<ul> <li>N 13</li> <li>TESTS</li> <li>5</li> <li>6</li> <li>305</li> <li>1</li> <li>37.</li> <li>38.</li> <li>37.</li> <li>37.</li> <li>37.</li> <li>38.</li> <li>37.</li> <li>37.</li> <li>38.</li> <li>37.</li> <li>37.</li> <li>37.</li> <li>38.</li> <li>37.</li> <li< td=""><td>52 L <math>\chi =</math> <math>\chi =</math> 2 40. 38. 37. 36. 36. 34. 33. 31. 27. ES</td><td>-BEU DMASS COS - B 3 40. 40. 38. 35. 35. 33. 32. 31. 30. 28.</td><td>M = 6 <math display="block">M = 6</math> <math display="block">M =</math></td><td><math display="block">\begin{array}{c} &amp; &amp; B \\ &amp; &amp; B \\ &amp; &amp; &amp; \\</math></td><td>ETA VS BACK Co, / Co, / BACK Co, / 6 38. 41. 42. 40. 37. 37. 34. 35. 34. 34. 34. 34. 34. 34. 34.</td><td>CDSA CDSA X= 4 - 0, 0 - 0,</td><td>B 34. 36. 40. 44. 43. 42. 42. X-NB</td><td>ANCE I 59 HIP 59 HIP 728. 32. 33. 39. 38. 41. 43. 44. 42. 37. RMAL</td><td>N GAMMA CO T <math>P_{T} = 6</math> 16. 16. 16. 16. 18. 19. 17. 15. 16. X-OVE</td><td>H IGel</td><td></td><td></td></li<></ul>	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36. 36. 34. 33. 31. 27. ES	-BEU DMASS COS - B 3 40. 40. 38. 35. 35. 33. 32. 31. 30. 28.	M = 6 $M = 6$ $M =$	$\begin{array}{c} & & B \\ & & B \\ & & & \\$	ETA VS BACK Co, / Co, / BACK Co, / 6 38. 41. 42. 40. 37. 37. 34. 35. 34. 34. 34. 34. 34. 34. 34.	CDSA CDSA X= 4 - 0, 0 - 0,	B 34. 36. 40. 44. 43. 42. 42. X-NB	ANCE I 59 HIP 59 HIP 728. 32. 33. 39. 38. 41. 43. 44. 42. 37. RMAL	N GAMMA CO T $P_{T} = 6$ 16. 16. 16. 16. 18. 19. 17. 15. 16. X-OVE	H IGel		
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8 7 6 5 4 3 2 1 0 599	<ul> <li>13</li> <li>TESTS</li> <li>5</li> <li>6</li> <li>305</li> <li>1</li> <li>37.</li> <li>38.</li> <li>37.</li> <li>37.</li> <li>38.</li> <li>35.</li> <li>31.</li> <li>27.</li> <li>23.</li> <li>4 ENTRI</li> </ul>	52 L $\chi =$ $\chi =$ 2 40. 38. 37. 36. 36. 34. 33. 31. 27. ES	-BEU DHASS, COS = B 3 40. 40. 38. 35. 33. 32. 31. 30. 28.	M = 6 $M = 6$ $M =$	$ \begin{array}{c}  & B \\  & 1 \\  & 1 \\  & 1 \\  & 2 \\  & 40 \\  & 38 \\  & 36 \\ $	ETA VS BACK Co, / Co, / 6 38. 41. 42. 40. 37. 35. 35. 34. 36. X-UN 0.	COSA $X_{f} < -0$ , $0, 0 \le -0$ , 7 37, 40, 42, 41, 37, 40, 41, 37, 40, 38, 38, DER	COLETA ACCEPT CONSCIENT CONSCIENT CONSCIENT CONSCIENT SET SET SET SET SET SET SET SET SET SE	ANCE I 59 HIP 59 HIP 728. 32. 33. 39. 38. 41. 43. 44. 42. 37. RMAL	$\begin{array}{c} 1 \\ R \\$	H IGel		
NASTER XLOC YLOC WLOC 1 BIN NOS 10 9 8 7 6 5 4 3 2 1 0 699	<ul> <li>N 13</li> <li>TESTS</li> <li>5</li> <li>6</li> <li>305</li> <li>1</li> <li>37.</li> <li>38.</li> <li>37.</li> <li>37.</li> <li>38.</li> <li>35.</li> <li>31.</li> <li>27.</li> <li>23.</li> <li>4 ENTRI</li> </ul>	52 L X = X = 2 40. 38. 37. 36. 36. 34. 33. 31. 27. ES	-BEU DHASS, COS = B 3 40. 40. 38. 35. 33. 32. 31. 30. 28.	M = 6 M = 6 M = 6 M = 6 M = 6 M = 6 4 40 41 41 37 34 37 34 32 30 27 31 Y-OVER Y-NORM	$ \begin{array}{c}     B \\     \hline     9./55 \\     \hline      $	ETA VS BACK C, / C, / C, / BACK C, / C, / C, / C, / C, / BACK C, / C, / C, / C, / C, / C, / C, / C, /	CDSA $X_{f} < -0$ , $0, 0 \le -0$ , 7 37. 40. 42. 41. 37. 40. 38. 38. 38. DER	B 34. 36. 40. 44. 43. 42. 42. 42. 42. 42. 35. 35. 40. 44. 43. 43. 42. 42. 42. 42. 35. 40. 40. 40. 40. 40. 40. 40. 40	ANCE I S9 HIP 59 HIP 7 28. 32. 33. 39. 38. 41. 43. 44. 42. 37. RMAL E+04	$\begin{array}{c} 1 \\ R \\$	H IGel		

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					I	FIG	URE I	Xd				٠
					400	Ge	eV PT	;=,25 G	eV	•		
1 SI BL	XFULL, 8 HGR	INDEF 9	ENDENT,	GRID= 'AS)	5M*10XF	*581* '.Asym	10PHI*10CS Metry Cent	A*10BET*2BEN ER ACCEPTANC	DIN/OUT E	•	DATE	120680/
НA	STER T	ESTS	17 P	TCUT A	-=,16	e 1.60	CNTRFX -	1< x-5	,/			
YL	0C DC DC 100	1 5	X=1	MAS	55 = (	No	(-/)*:	3+6,1Ge	V			
4 L	06 199		y = c	<i>cos</i>	人 =	Ny	× 0.1 - 0	0.05			-	
BI NC	N S	1	2	3	4	5				•	-	
	10	0.	0.	0.	.0.	8.						I C
	9	0.	4.	21.	23.	25.						-
	7	20.	2J. 34.	32. 41.	32. 43.	44.						
	6	26.	41.	49.	54.	57.						
	ີ ເ	32. 70	4/.	54. 40	60. 45	62. 49						
	3	42.	59.	66.	72.	76.						
	2	48.	65.	75.	84.	87.						
	1	56.	75.	87.	90.	92.						
0	8922	ENTR.	IES	*			X-UNDER	X-NORMAL	X-OVER			
				,	Y-OVER		0.	0.	0.			
					Y-NURM Y-NARME	AL	0. : A	.22E+04	0.	•		
n					I-ORDE	<b>η</b>	۷.	V -	V.			•
15	XFULL,	INDE	PENDENT	, GRID	=5M*10X	F#5PT#	10PHI#10C	SA*10BET*2BEN	IDIN/OUT		DATE	120680/
ρL	0 NOA	10		H0 	1 FI	H011		4HRD HULLFIND				
NA	STER 1	IESTS	17 P	TCUT	$p_{r} = .10$	Sel 62	FRUDFX	$3 \leq \chi_{p} \leq$	-7			
ΧL. ΥΙ	00 00	1	$\chi = \lambda$	MAS	s = 0	Nx-	1)*3+	6 IGaV	• ·			
WL	00 100	)9			- <b>-</b> (,			on Ger				
			Y = 0	cos	$\alpha = \Lambda$	/ y ,¥	0,1-0.	05		•		
BI	N		~	7		-						
	<b>P</b>				4							
NU	S	1	- 2	3								
· NU	s 10	0.	0.	0.	0.	0.						
UN ·	S 10 9	0. 12.	0. 33.	0. 45.	0. 44.	0. 42.			· · ·			
ŇŬ	S 10 9 8	0. 12. 42.	0. 33. 47.	0. 45. 45.	0. 44. 46.	0. 42. 46.						
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### II.e. Multi-µ Production

There are several open questions on how to run the multi- $\mu$  experiment in the P-645 apparatus. Should one require a minimal  $p_T^S$  so one can run at higher intensity? What will the duty factor of the Tevatron be? As pointed out in the introduction (and from Figure II), at  $p_T^S = .25$  GeV the probability of an extra track in one nanosecond is .08 at 2 x 10<sup>13</sup> protons 1 minute spill if we use the off-line time resolution of the system. On the other hand, if the Tevatron comes on for a long time with low luminosity,  $p_T^S$  could be set to 0 and multi- $\mu$  could be collected with an enormously high efficiency. In fact, P-645 is an ideal experiment for the first stage of Tevatron II operations because of its extremely high efficiency.

### II.f. Mu-Neutrino Correlations

P-645 is not a proposal to measure  $\mu\nu$  coincidences. However, we feel duty bound to point out to the committee that such measurements may be feasible and by using our beam dump as a prompt neutrino beam dump the option for doing these measurements in the future is left open.

Suppose we set a threshold of 40 GeV in the v detector and assume that the  $v_e$  ( $\bar{v}_e$ ) flux in J. K. Walker's memo of 4/3/1980 is equal to the  $v_{\mu}$  ( $\bar{v}_{\mu}$ ) flux, i.e., ~  $10^6$ /GeV x m<sup>2</sup> x  $10^{13}$  protons at Lab. C. Using a  $\Delta E_v$  of 60 GeV (40-100 GeV,  $\bar{E}_v = 70$  GeV) and 16 m<sup>2</sup> for the LABC detector, we have  $10^9 v/10^{13}$  p. The probability of detecting a 70 GeV neutrino going through 3 x  $10^3$  g/cm<sup>2</sup> is 70 x 1.8 x  $10^{-11} \approx 10^{-9}$  so one would have one prompt v per  $10^{13}$  protons.

From Figure II (and the discussion in Section IIa, the probability of a  $\mu$  track in 1 nanosecond per 2 x  $10^{13}$ /minute is .082 (for  $p_T^S = .75$ ), i.e., for  $10^{13}$ /sec it will be only .36. If we assume that 10% of the  $\mu$ 's

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associated with prompt  $v_{\mu} = 70 \pm 30$  GeV will have a  $p_T > .75$  GeV we can have a  $\mu\nu$  event per 10<sup>14</sup> protons with a 2 to 1 probability of it not being a chance coincidence. If the off-line resolution is .5 nanosecond the signal becomes cleaner. One can see the possibility of 10<sup>3</sup>  $\mu\nu$  coincidences for 10<sup>17</sup> protons on target.

The problems are formidable. The v detectors will have to take beam in at least a full second spill, something which only E-613 is doing at this time. The drift cells along the  $p_T^S$  boundary will have recovery problems which will require great technical skill to handle. Also, the signals from the  $\mu$  detection will have to be delayed ~ 1  $\mu$ sec before they are latched. Nevertheless, we believe that all these difficulties can be overcome if the effort is considered worthwhile. Again, we emphasize: we do not propose to do it at this time -- we only wish the committee to be aware of the potential for this physics.

### III. LOGISTICS

### III.a. Apparatus and Personnel

In terms of physics, beam occupancy and experimental lifetime P-645 is a mammoth proposal. In terms of costs and demand on equipment it is moderate. The solenoid (exclusive of return yoke) should cost between \$500 K and 750 K and since it is only 2T it is the easiest kind of superconducting magnet to build. The return yoke, as well as the other magnets and spoilers are supposed to be very cheap because of the Argonne steel - they should not cost more than 300 K. The hodoscopes are just more of what we had in E-439  $(175 \rightarrow 750$  elements) and should cost less than \$250 K. The drift cells, of which we have 7,500, are the type used in Lab C and were estimated last year at \$15/cell so 150 K is a conservative estimate for them. The electronics, cabling, on-line computer, etc., is standard also. We apologize for not having a complete worksheet of costs and tasks, with associated dates all worked out. We feel that first the key decisions have to be made on whether the Laboratory should pursue this program and in what beam line and what time frame, before we start working out the additional details.

The same holds for the group size and its competency to do the experiment. George Glass, a highly experienced high energy physicist will join our group and spend next year at Fermilab working on this proposal. If the Laboratory indicates its support for this program many other groups will join us and by the time the Laboratory is ready to develop an agreement the enlarged collaboration will be ready too.

### III.b. Beam

We consider 3 alternative scenarios; the order in which they are presented does not reflect our preference. 1 - P-West is upgraded to receive primary extracted beam and the  $\bar{p}$  and pi experimenters agree to use the P-645 apparatus for their measurements. In that scenario the P-645 system is left in situ for years, beginning with Saver (500 GeV proton physics and lower momentum secondary beams), through the first stage of Tevatron II, when the extracted beam will be used to maximum efficiency by the high acceptance of P-645, to the full range of the P-645 program as Tevatron II turns out more protons. Since P-645 is compatible with E-613, a possible solution to continuing E-613 if a beam dump is not built in the neutrino line, would be to place E-613 downstream of P-645 in p-West.

2 - P-645 is set up in the M2 line in front of E-613 and the polarized beam is built elsewhere. Unfortunately, M2 does not have the capacity for high intensity secondary beams.

3 - P-645 is placed in the prompt neutrino line as part of the neutrino beam dump (Appendix II). The difficulty here lies in the fact that the slow spill running contemplated by the neutrino experimenters is still at a rate of  $10^{14}$ /sec. Whether they can be reoriented towards longer spills [in the hope of running  $\mu\nu$  coincidences at a future date] is a doubtful proposition. On the other hand, there is the option of running P-645 when they are studying decay neutrinos. In that case the beam line would be developed well before the full capacity of the Tevatron II is achieved. P-645 could start running with the 500 GeV Saver beam, trickles of Tevatron II beam (useless for neutrino physicists) and slow spill when Tevatron II is in full operation and conventional neutrino running is on.

Thus, finally, we come to the question posed to us by the PAC: What is the muon flux from our dump design at the 15' bubble chamber? We have given our design (Appendix II) to the MIT (30") group to test out;

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unfortunately their computer was down and as of this moment we do not have the answer. This design should be considered as preliminary in any case; we will be working with the MIT group in the next few weeks and hope to have a proper answer for the committee.

We hope that the committee will contact us for any details and additional information. Our office phones are:

(617) 437-2933 (Glaubman),

437-2936 (Garelick),

437-2902 (Physics Office) and

(617) 861-9443, or 8615 (Glaubman) and

(617) 469-0980, 325-1644 (Garelick) .

We will be glad to provide information at any time of the day, any day.

### Appendix I

Single µ Rates in P-645 Detector

Anderson et al. give the single  $\mu$  rate in pBe at 150 GeV from dimu production (PRL <u>37</u>, 803 (1976)). For the purposes of crudely estimating our rates this should yield reasonable values. We further assume that the rates scale as &ns = 1.7, that the Be  $\mu$  production is  $A^{2/3} \simeq 4$  times the nucleon  $\mu$  production, that the ratio of W  $\mu$  production to total cross section is  $A^{1/3} = 5.6$  times the ratio of nucleon  $\mu$  production to total cross section of 50 mb = 5 x  $10^{4}$   $\mu$ b. (At low mass the dimu production seems to have the same A dependence as hadronic production. We leave the factor of 5.6 in as a margin of safety to compensate for dimu production by secondaries.) If F is the number of microbarns of cross section given by Anderson et al. and Y is the  $\mu$  yield per proton on the beam dump then:

$$Y = \frac{1.7 \times 5.6 \times F}{4 \times 5 \times 10^4}$$

The number produced per second from a one minute spill of 2 x  $10^{13}$  protons

$$N = \frac{2 \times 10^{13}}{60} \quad Y = 1.6 \times 10^7 \text{ F}$$

We obtain F for individual mass,  $x_F$  and  $p_T$  bins from the following table based on Anderson et al. (They fit to a  $d\sigma/dp_T^2 \propto e^{-bp_T}$  and  $\frac{d\sigma}{dx_F} = A (1-x_F)^c$ distribution. We extend this assumed distribution to negative  $x_F$  by putting  $\frac{d\sigma}{dx_F} = (1 - |x_F|)^c$  and combine the resonance yields with those of the continuum at the proper masses.) Table 1

(A in  $\mu$ b, M in GeV, b in GeV<sup>-1</sup>)

I	. M	∆M	Α	b	с
1	•3	045	62	4.6	8.3
2	.5	.4665	20	4.6	6.5
3	.79	ρ + w + .6593	16.3	3.8	4.3
4	1.03	φ + .93 - 1.13	3.6	3.9	5.6
5	1.56	1.13 - 2	•64	4.1	5.1

In terms of our bins (normalizing the  $p_T$  distribution and integrating over  $x_F$  and  $p_T$ ) the cross section for a bin is:

$$F(\bar{M}, \Delta M, \bar{x}_{F}, \Delta x_{F}, \bar{p}_{T}, \Delta p_{T}) = F(I, \xi_{1}, \xi_{2}, n) =$$

$$= A(I) \frac{1+2n}{e^{2n}} \left(1 - \left(1 + \frac{2}{1+2n}\right) / e^{2}\right) \frac{\xi_{1}^{c+1} - \xi_{2}^{c+1}}{c+1}$$

where  $\overline{M} = \overline{M}(I)$ ,  $\Delta M = \Delta M(I)$ , c = c(I), b = b(I) and:

$$\xi_1 \equiv 1 - |\bar{x}_F| + \frac{1}{2} \Delta x_F, \qquad \xi_2 = \xi_1 - \Delta x_F,$$
  
 $\bar{x}_F = -1 + (m + .5) \Delta x_F, \qquad m = 0, 1, \dots, (2/\Delta x_F - 1)$ 

and:

$$\Delta p_{T} = 2/b(I)$$
,  $\vec{p}_{T} = (2n+1)/b(I) = (n+\frac{1}{2})\Delta p_{T}$ ,  $n = 0, 1, 2, ...$ 

We used five  $p_T$  bins and 10  $x_F$  bins ( $\Delta x_F = .2$ ), thus giving us 250 bins in which to calculate  $\mu$  production according to the formula for F.

To obtain the rate of single  $\mu$ 's in our apparatus, our program generated 2000  $\mu$  pairs in each bin, 10 for each angle variable ( $\varphi$ , cos $\alpha$ ,  $\beta$ ) and one each for bend in/bend out. If on tracking a  $\mu$  hit the back detector the event was recorded and a number, W = 1000 \* F was attached to the event. In addition to using these numbers for weighing x, y displays they were summed (S) to give the total number of  $\mu$ 's hitting the detector.

$$8 \times S = 8 \times 2000 \times 1000 \sum_{M_s p_T, x_F} F \times Acceptance$$

= 1.6 x 
$$10^7 \sum F$$
 x Acceptance.

Since 1.6 x  $10^7 \sum F = \mu$  yield/second from 2 x  $10^{13}$  per minute protons of 800 GeV on tungsten, 8S =  $\mu$  rate in our detector. These are the single rates we use for various  $p_T^S$  in Figure II.



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# APPENDIX II

### C- MAGNETS (FRONT VIEW)



SIZE(M) . 92 11.12 2 x2,42 GAP(cm) 8 x 74 8 × 150 12×40 20 × 340

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ΜI

SCALE: ICM = 1 M



Update to Fermilab Proposal 645

June 11, 1981

### MUON PRODUCTION IN A TEVATRON BEAM DUMP

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### A. Introduction

In April 1980 we proposed that the beam dump contemplated for the neutrino area be built as an instrumented beam dump for dimuon physics. The proposal, P-645, was presented at the PAC meeting that April and an addendum with more detail and a reconfigured experimental arrangement was submitted to the PAC in June 1980. At that time we requested the PAC to consider the alternative of running P-645 as a stand alone experiment in a primary or secondary beam. The proposal was rejected as a neutrino associated experiment and was not considered otherwise. In January 1981 we requested the PAC to reconsider P-645 as a stand alone experiment; we have been advised that to avoid confusion we should rewrite our proposal without reference to the neutrino beam dump. This document should be interpreted as a letter of intent based on our experience on E-439 and our earlier proposals as reflected in the physics and design of P-645.

### B. Summary of Physics Objectives

I) <u>Drell Yan, gluons and QCD</u>. Dimuon production is a sensitive and reliable tool for the study of parton (quark, antiquark, gluon) structure functions and QCD. The dimuon experiments at Fermilab have been each optimized for different purposes---high sensitivity with high resolution but poor angular and  $x_F$  acceptance, good resolution and angular and  $x_F$  acceptance but poor sensitivity, high pperp and mass sensitivity but poor polar angle and  $x_F$  acceptance, high mass sensitivity and  $x_F$  acceptance but poor resolution and angular acceptance, etc. For the Tevatron era only one dimuon experiment has been approved: E-605. Other groups have

- 1 -

indicated their intent to continue their dimuon physics studies as before since any dimuon physics that one can do with beams from a 400 GeV machine can be done better and easier with beams from a 1000 GeV machine.

We propose that the whole range of dimuon physics that will not be covered (properly) by E-605 should be done on one device with very high acceptance in <u>all</u> kinematic variables and very high sensitivity. Furthermore, the device should be highly sensitive as we go to the kinematic limit of the different variables simultaneously. We expect the measurements of dimuon production over the <u>full</u> kinematic range to restrict the prescriptions of QCD to the point where the theory loses its flexibility and is proven either true or false. We consider as even more interesting the possibility of discovering a completely new effect or phenomenon if the sensitivity and kinematics are taken to the extreme.

II) Weak-electromagnetic interference. Quark-antiquark annihilation to a massive dimuon state can be due to their electromagnetic charge or their weak charge, i.e., it can proceed via a  $\gamma$  or a  $Z_0$ . The mass of the  $Z_0$  is apparently much higher than the dimuon masses available even with Tevatron beams, so production via the  $Z_0$  is too far off the resonance curve to compete with the Drell Yan process, but the interference between the  $\gamma$  amplitude and the  $Z_0$  one leads to a small, but detectable, forwardbackward asymmetry in the dimuon polar angle distribution. The asymmetry parameter a is the coefficient of cos  $\theta$ \*, where  $\theta$ \* is the angle between the outgoing  $\mu^-$  and the incoming quark (not  $\overline{q}$ ). Detailed descriptions of

- 2 -

the theory of the asymmetry measurements are given in the P-583 proposal and associated documents that were submitted to the PAC together with P-645. The experiment should be run with proton,  $\pi$ and  $\pi^+$  beams of the highest intensity and energy. For high mass dimuon production,  $M^2 = x_1 x_2 S > 100 \text{ GeV}^2$ , the leading beam quark  $(x_1)$  and target quark  $(x_2)$  will be: for proton beam (with  $x_1 - x_2 = x_F > 0.3$ )  $x_1 = u, x_2 = \overline{u}$ ; for  $\pi^-, x_1 = \overline{u}, x_2 = u$ ; for  $\pi^+, x_1 = \overline{d}, x_2 = d$ . The ratio of the interference term to the E.M. term will be proportional to the ratio of the weak charge to the electric charge. The asymmetry will have the same sign for the  $\pi^-$  and the proton (but the direction of the quark is the direction of the target for  $\pi$ 's) and the opposite sign for the  $\pi^+$ . The fact that the secondary beams have lower intensities and energies than the primary beam is compensated for by their higher cross section. Asymmetries due to higher order electromagnetic effects can also be separated out better if all three asymmetries are measured; in any case, they hardly depend on  $M^2$  whereas the  $\boldsymbol{Z}_{\bigcap}$  -  $\gamma$  interference is proportional to M<sup>2</sup>. There are many systematic physics checks on the asymmetry measurement---for protons it should go to zero at  $x_{F} = 0$ , and in all cases the T data should (probably!) show no asymmetry.

III) <u>Multi-muon studies</u>. The apparatus can collect excellent data on multi- states especially those that decay to  $\psi\psi$  [ $(\psi)^2 \rightarrow (\mu^+)^2(\mu^-)^2$ , 1/2 % branching ratio].

### C. The P-645 Apparatus

Figure I is a sketch of the apparatus. The target is followed by magnetized iron to reduce the hadronic background and to bend out (in the vertical plane) the low pperp single muons. This is followed by

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Figure I



a large volume superconducting solenoid for momentum analysis (also bending in the vertical plane). There are three sets of drift chambers on either side of the solenoid and three sets of hodoscopes. Each set of hodoscopes consists of an x and a y array of counters and each set of chambers consists of two x, y arrays (to remove the left right ambiguity) and a tilt. The hodoscope is used for triggering and road definition (for tracking). All the detectors have an inactive area in the shape of an X (upper and lower triangles = inactive area). The slope of the detector's inner edges is determined by  $P_T^S/K$ , where  $P_T^S$  = minimal  $P_T$ that the single  $\mu$  must have to be detected, and K is the momentum kick of the magnet. There are spoilers and neutron absorbers to reduce the background in the detectors. The drawing and the numbers to be quoted below are for 800 GeV protons (4m magnetized iron) at the highest Tevatron intensities ( $\sim$  3 x 10<sup>11</sup> protons/second). Secondary beams at lower energies and intensities will be run with a smaller length of magnetized iron so as to keep the same mass and pperp resolution as for 800 GeV protons.

The momentum resolution is about 2%; the number of radiation lengths is about 300 (not involved in the momentum resolution). The  $2\mu$  P<sub>T</sub> resolution is 0.3 GeV. The mass resolution drops from 4% at 6 GeV to 3% at 9 GeV and 2% at 15 GeV and does not depend on  $x_F$  and  $P_T$ .

The singles rate in the detector depends strongly on the  $P_T^S$  cut (i.e., the slope of the wedge or X). Figure II shows the number of singles over the whole detector (62 millisteradians) per µsec. The change in the singles rate as a function of  $P_T^S$  is very large and indicates the concentration of low mass events along the X boundary. Figures IIIa and IIIb show

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FIGURE II



- 6 -



the effect of  $P_T^s$  on the acceptance at low  $P_T^r$  and  $P_T^r = 6 \text{ GeV}$  respectively.

As in E-439, matrix logic will be used to give preference to high mass or high pperp triggers. Approximately 60% of our high-mass matrixlogic triggers in E-439, which was run at comparable intensities, were two track events. Figure IV is a typical CHANCE/TRUE = (LIKE SIGN)/ (UNLIKE SIGN - LIKE SIGN) vs. intensity curve from E-439. It shows how clear the dimuon signal is. Figure V shows how sharply the residual like sign fraction drops with dimuon mass (i.e., with the  $P_T$  of the muons). D. The Data

## I) General comments.

1. Very large solid angle in the dimuon center of mass system means a large lever arm for angular distribution and asymmetry measurements. This is very important for the study of the Drell-Yan process, studies of the angular and azimuthal distributions at high pperp and electroweak interference.

2. High acceptances means more events per proton on target. Protons on target will be a scarce commodity in the Tevatron era, and the people in charge should see to it that they are used most efficiently.

3. High sensitivity means that rare phenomena can be observed. Furthermore, since these may tend to be at the kinematic limits, there is a special advantage to combining wide range with high sensitivity. We have appended to this proposal a large set of geometric acceptances curves to illustrate the kinematic range we propose to cover.

### II) Rates.

Example 1: The asymmetry (electroweak interference) measurement, Using (for 800 GeV protons)

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FIGURE IV







$$\frac{d\sigma}{dM} = 0.8 e^{-0.65M} \text{ nb/GeV}$$

and allow for an  $A^{1/3}$  gain in the ratio of the Drell-Yan to total cross section ( $^{\circ}$  40 mb) the number of dimuons at 12 GeV is a one GeV bin, per proton, is

$$\left(\frac{dN}{dM}\right)_{M=12 \text{ GeV}}$$
 = Acceptance x 4.3 x 10<sup>-11</sup>/GeV proton

which translates into

$$\left(\frac{dN}{dM}\right)_{M=12 \text{ GeV}} = \text{Acceptance x 5 x 10}^{-12}/\text{GeV proton}$$
  
0.3F<0.7

For this mass and  $x_F$  bin the acceptance is 66% for  $-0.65 \le \cos \alpha \le 0.65$ and drops to 36% at  $\cos \alpha = \pm 0.85$ . Ignoring the effect of the  $1+z^2$  term  $(z = \cos \alpha)$ 

$$N^{\pm} = \int_{0}^{z_{1}} C \left[1 \pm az\right] dz = Cz_{1} \left[1 \pm \frac{1}{2} a z_{1}\right] = \frac{1}{2} N \left[1 \pm \frac{1}{2} a z_{1}\right]$$
$$A = \frac{N^{\pm} - N^{-}}{N} = \left[a z_{1}\right] / 2$$
$$A = 1/\sqrt{N} = \left[z_{1} \delta a\right] / 2$$

Using Acceptance = 0.6 for -0.8 < z < 0.8 ( $z_1 = 0.8$ ),

$$N = 3 \times 10^{-12} / \text{GeV proton}$$

and in 1000 hours of running at 2 x 10<sup>14</sup> protons/hour we would have for a 1 MeV bin at 12 GeV,  $0.3 \le x_F \le 0.7$ , N = 6 x 10<sup>5</sup> dimuons and  $\delta a = 3 \times 10^{-3}$  $\sim \frac{1}{4} a_{\gamma Z_0}$  where  $a_{\gamma Z_0}$  is the contribution of  $\gamma Z_0$  interference to the asymmetry. At lower mass the statistical accuracy will be higher but  $a_{\gamma Z_0}$  will be a smaller part of the asymmetry; at higher mass  $\delta a$  will increase but  $a_{\gamma Z_0}$  will be a more significant part of the asymmetry. We expect a reasonable measure of the interference in 1000 hours at 2 x  $10^{14}$  protons/hour, and a comparable result for  $\pi$  beams.

Example 2: Angular distributions at high pperp.

We use

$$\frac{d^2\sigma}{dM dP_{T}} = 1.4 P_{T} e^{-0.65M-1.37 P_{T}} nb/GeV^2$$

For a 1000 hour run (2 x  $10^{11}$  protons)

$$\left( \frac{d^2 N}{dM dP_T} \right)_{M=6 \text{ GeV}} = \text{Acceptance x } 10^6 \text{ events/GeV}^2$$

$$P_T=6 \text{ GeV}$$

Considering our large average acceptance the feasibility of measuring both the angular distribution  $(\cos^2 \alpha)$  and the azimuthal distribution  $(\cos 2\beta)$ are excellent. Again we have many systematic checks---for example, the origin of  $\beta$  rotates throughout the apparatus, and we also have a four fold symmetry in  $\beta$ . For details of the acceptance in  $\beta$  and  $\cos \alpha$  see the Appendix.

### E. Costs

We estimate the magnets at  $\sim$  \$1000 K, the hodoscopes at \$150 K, the drift chambers at \$150 K and the electronics at \$500 K.



PROTONS XF <0 ANGULAR ACCEPTANCES AT HIGH Acceptance Fig A2 Acceptance M= 6.1 and 9.1 GeV, 15 = 38.7 Ge M = 6.1 and 9.1 GeV, Js = 38.7 GeV $\pi_F < 0; P_T = 6.1 \text{ GeV}$ xF <0 , PT = 12.1 GeV Cos & dependence for different B the plane by PIB B (Eran) (PN (m) In the rest system of Cosx dependence for different B Acceptunce 49.5 .3 .2 .1 .8 1.0 con ac -



ANGULAR ACCEPTANCE: LOW P. (ASYMMETRY, DRELL YAN)

Fig. R<sup>3</sup>=.75GeV H6 PT = .75 Ge R=.16.V JS=38.76.V Acceptance Acceptance 600 P- =.1  $\langle \chi_{E} < \cdot 1$ Mun= 3 < x= <.7 cos & dependence for different Man Mun = Cos & dependence. For different Mugu 9,1 GeV . 18.160 con a

PION (400GeV) ACCEPTANCES

DRELL-YAN ANGULAR DISTRIBUTION G. ACCEPTANCE AT HIGH XE VS= 27.4 Get  $\sum_{r=1}^{2} \sqrt{5} = 27.4 \text{ GeV}$  $P_{T}^{s} = .25 \text{ GeV}$ -X\_= -3,.7,9 ,9 Acceptance PT = 0.1 GeV Acceptanc ¥...... Cos & dependence for different XF PT dependence for different Maje = ,25 60 9.1 Gev 616.4 --- 10 8 : ---- 12 .8 cos d



HIGH PT ANGULAR ACCEPTANCES X=>0



PLON BEAM HIGH PT ANGULAR ACCEPTANCES XELO Fig A13 -Fig-A12 15 = 27.4 5=27.4 Gel  $P_{T}^{S} = -25^{-}6e$ R = 6.1 GeV R= = .256.1 R= 12.16.1 Mun = 6.1 and 9.1 6eV XF <0 XF < 0 , Man = 6.1 and 9.1 Ge Cos & dependence for different B Acceptance Acceptence Cos a dependence foi different p

