Probing odd chirality at RAMPEX[1]

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RAMPEX[2] is a one-spin experiment on polarized target at the 70-GeV/c proton accelerator in Protvino. The detector was designed to have two arms. The first arm incorporates magnet, proportional chambers, two Čerenkov counters, ECAL1 and HCAL. Now this arm is being tested at the accelerator runs twice a year. Another arm was planned to be a fine-granulated ECAL2. It will be constructed later.

So the existing detectors with the planned second ECAL allow to study one-spin asymmetry in the reaction

$$p + p_{\uparrow} \to \pi^{\pm} + \pi^{0} + X,$$

which is relevant to the twist-2 chiral-odd quark distribution function $h_1(x)$. Two detected pions are produced in the back-to-back CMS kinematics at large transverse momenta.

The simulation of the process was made with PYTHIA in the chosen kinematic region: $1.5 < p_{T1},\ p_{T2} < 2.5\ GeV/c$ under the selection rules that correspond to the RAMPEX triggering, acceptance and detection efficiency.[3]

Fig. 1 shows the integrated luminosity $\int \mathcal{L} dt = 10$ events/pb and the corresponding number of the filtered events ($\sim$2000).

The p_T properties of the filtered events are presented on Fig. 2(a,b,c). The errorbars of the asymmetry $A(p_T)$ are plotted in Fig. 2d in red, green and blue for the assumed measured asymmetry values 0.05, 0.10 and 0.20, respectively.

As is seen from Fig. 2d, the reasonable measurements of $A(p_T)$ can be made during the 4-month beam exposition, only if the asymmetry value at $p_T = 1.5 \div 2.5$ GeV/c is equal at least 20%.

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1) **Talk given at the Workshop 'Future Transversity Measurements', BNL, Sept. 18-20, 2000.**
2) look at http://rampex.ihep.su/
3) S. Akimenko et al, Proposal of experiment RAMPEX, Preprint IHEP 97-58, 1997.

Lumi

$L = 5.4*10^{31}\ cm^{-2}\ spill^{-1}$

spill = (9+1) s

Run time: 2 months
+ 2 months

σ= 220 pb

$\int L dt$ = 10 ev/pb

Statistics

$N_{filtered} = 2.2*10^{3}$ events

Fig. 1. Luminosity and expected statistics at p_T=1.5-2.5 GeV/c.

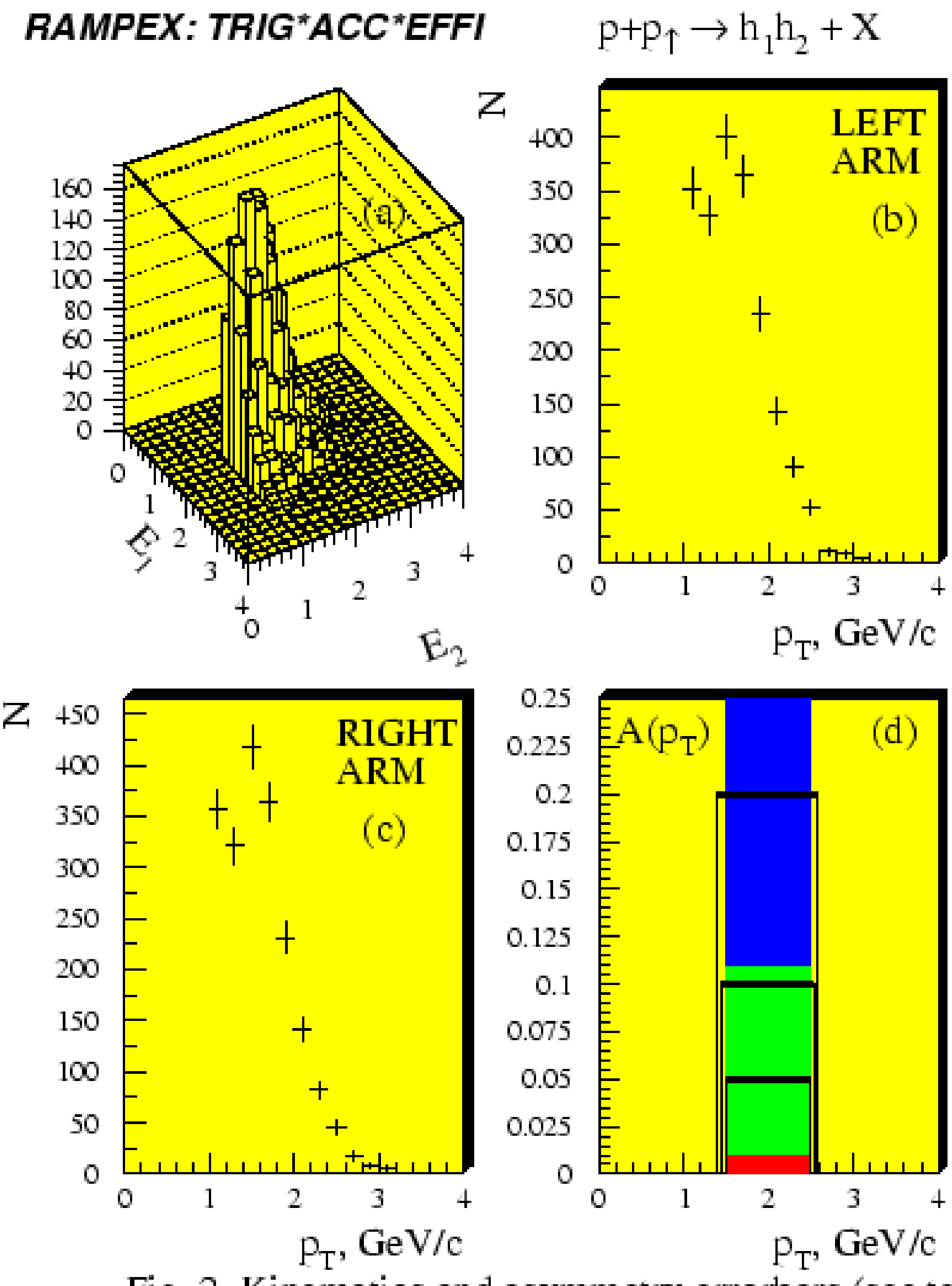

Fig. 2. Kinematics and asymmetry errorbars (see text).