Should $\bar{p}p \to \bar{\Lambda}\Lambda$ be revived?

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Brief History:

- PS185 at LEAR proposed 1981, begins 1984
- $\bar{p}p \rightarrow \bar{\Lambda}\Lambda$ proposed for CP: Donoghue, Holstein, Valencia, He, Pakvasa 1986
- CERN Hyperon CP study group: technique feasible $\rightarrow 10^{-4}$ statistics, 10^{-5} systematics
- Hsueh and Rapidis propose new $\bar{p}$ storage ring at Fermilab 1992 $\rightarrow$ rejected
- LEAR shut down 1996, PS185 ends
- PS185 publishes world's best limit to date:

$$A_\Lambda = 0.013 \pm 0.022$$

P. D. Barnes *et al.*, Phys. Rev. C **54**, 1877 (1996)

sections and polar-
e characteristic of
se matters are dis-

5 data very close to
taking has recently
n unexpected struc-
t $\epsilon \sim 1$ MeV excita-
l higher-momentum
g analyzed (Bröders
1]).
$\bar{\Lambda}\Lambda$ transition have
[15–42]. These de-
es: (1) the strange-
hannel exchange of
riginates from the
the subsequent pro-
d by four "specta-
cused on quark de-
3]), and (3) model-
ntum data that are
mposition [34–36].
ute here, it may be
ing reaction mecha-
o been done in the
anomaly [5] in the
.

xpected to be short
essary to create the
pectation that quark
K-meson exchanges
. However, given the
ions, we expect that
be of major signifi-
rstanding of absorp-
more about the de-
In order to deal with
dy coupled channels
-channel techniques
data.
tistics measurements

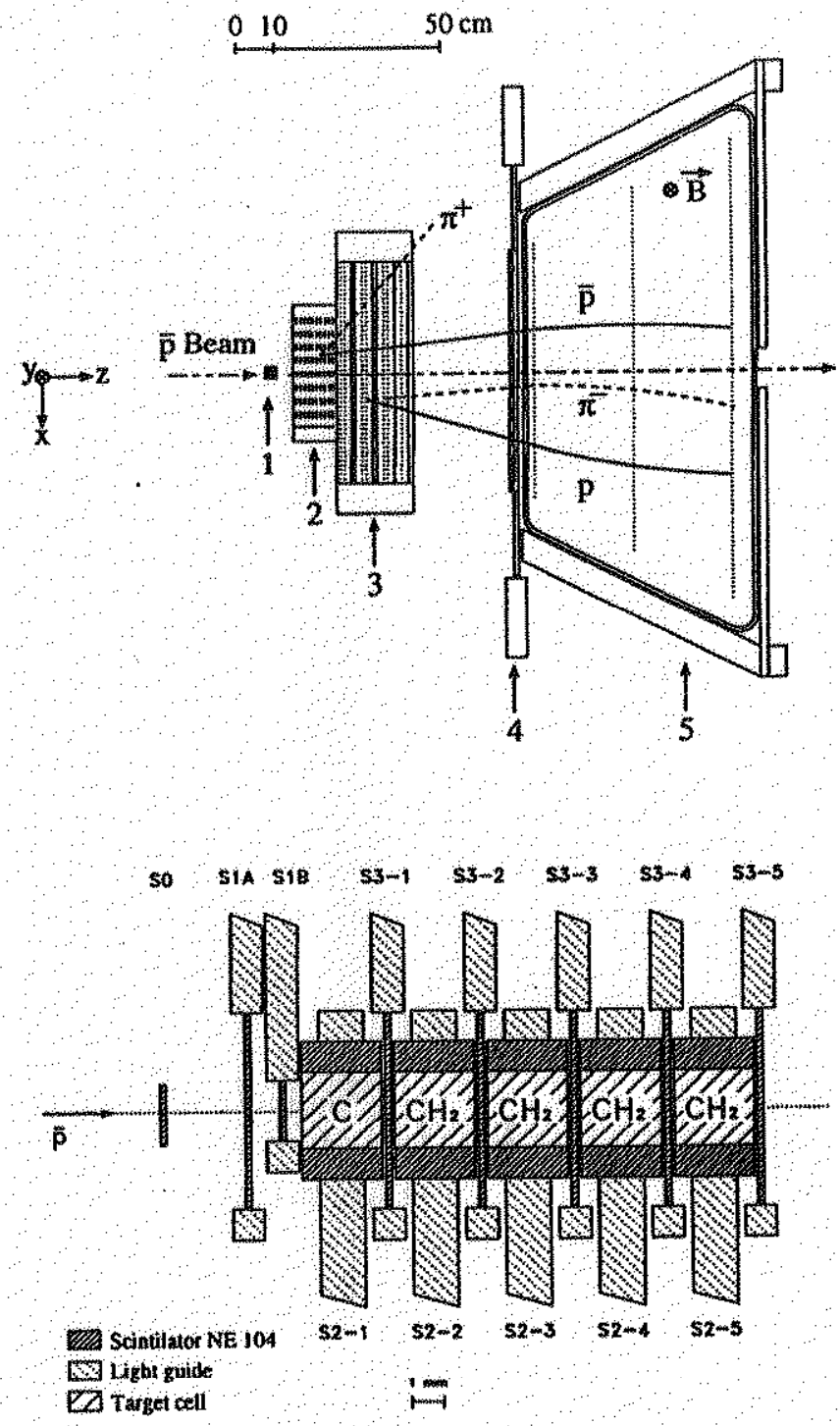

FIG. 1. Overview of the PS185 detector system. (1) segmented neutral trigger target, (2) multiwire proportional chambers (MWPC's), (3) multiwire drift chambers (MWDC's), (4) scintillator hodoscope, and (5) solenoid "baryon indentifier" with drift chambers. The lower part of the figure shows a detail of the segmented target.

state spin observables [43]. The experimental setup, shown

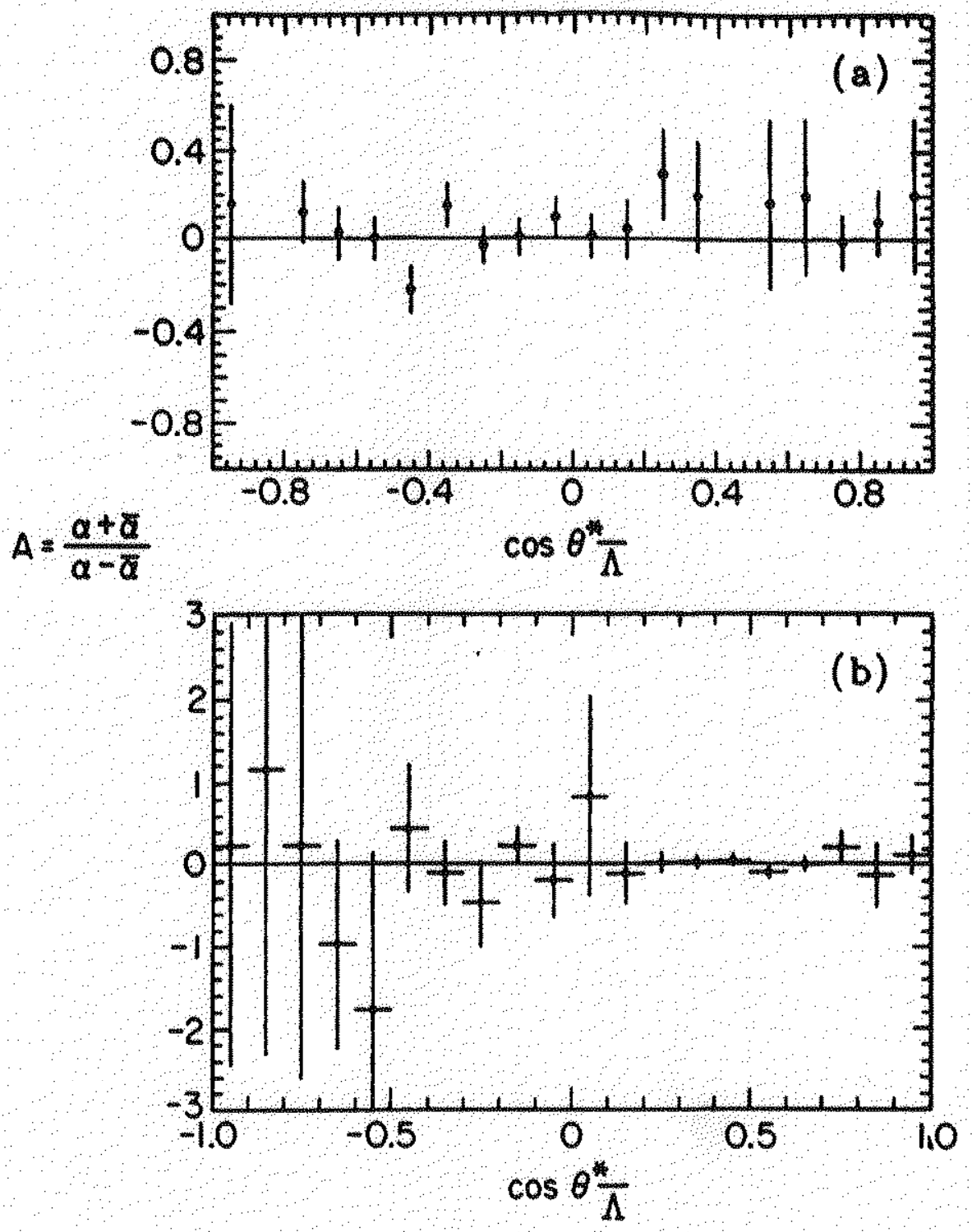

FIG. 7. Angular distributions of the ratio $A = \langle(\alpha+\bar{\alpha})\rangle / \langle(\alpha-\bar{\alpha})\rangle$. The top panel shows data at 1.642 GeV/c and the bottom one shows data at 1.918 GeV/c.

CP Reach in p pbar -> Λ Λ-bar

	L /cm^2/s	pbar/hr	tgt density A/cm^2	N_pbar/s	I_pbar mA	N_pbar	days @50%	events	CP reach
P859:	1.6E+32	5.8E+10	1.0E+14	1.6E+18	0.26	8.0E+11	88	2.3E+09	1.0E-04
	1.0E+33	3.6E+11	3.0E+14	3.3E+18	0.53	1.7E+12	365	5.9E+10	2.0E-05
xP859:		6.3						26	5.1

$\bar{p}$ source upgrade?

- Main injector → ~100 kW of 150-GeV beam on $\bar{p}$ production target from ~10 kW of 8-GeV Booster beam
- Proton source upgrade → 4 MW at 16 GeV proposed for a Muon Collider
- Neutrino Factory 6-month study: 1 MW at 16 GeV

⇒ **Is ×10 in $\bar{p}$/s feasible?**

"The Recycler changes everything!"

-J. Peoples

→ **Who else would be a customer?**