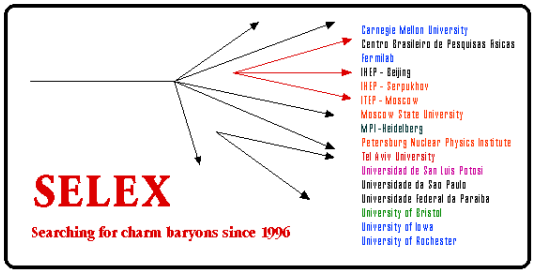

SELEX ANALYSIS STATUS AND PLANS

Fermilab
February 26, 2003
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for the SELEX Collaboration

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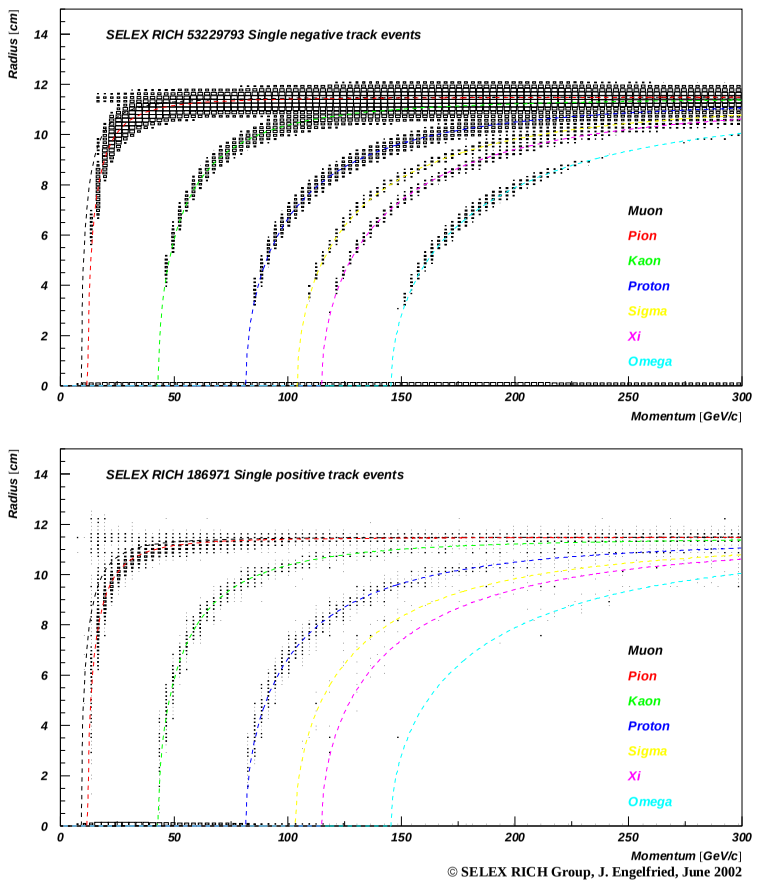
Major Contributions (so far)

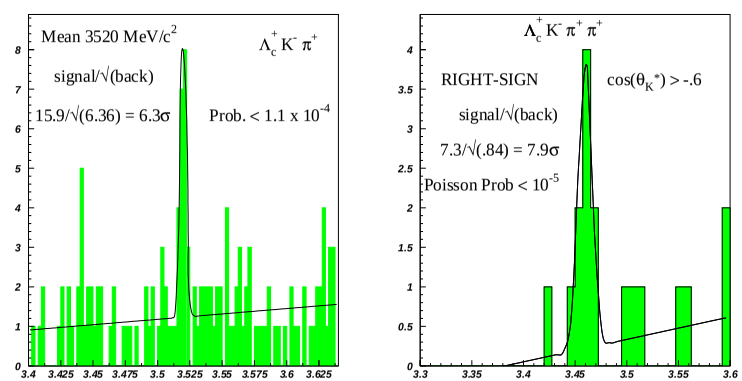
- First large-scale multiparticle RICH



- First measurement of Cabibbo-suppressed charm baryon branching ratio

- First measurements in unexplored areas of charm hadroproduction
  - Use of Baryon Beams
  - High Efficiency for $x_F \sim 1.0$ for $p_T \leq 2.5$ GeV/c

- First Observation of Double Charm Baryon Candidates



SELEX Journal Publications

1. *Production Asymmetry of D_s from 600 GeV/c Σ^- and π^- beam* M. Kaya *et al.* , Accepted by Phys. Lett. B (2/24/03), Fermilab-Pub-03/026-E.

2. *First observation of the doubly charmed baryon Ξ_{cc}^+* M. Mattson *et al.* , Phys. Rev. Lett. **89**, 112001 (2002). Spires citations 12

3. *Hadronic production of Λ_c from 600-GeV/c π^-, Σ^- and p beams* F. G. Garcia *et al.* , Phys. Lett. B **528**, 49 (2002). Spires citations 7

4. *First measurement of $\pi^- e \to \pi^-$ e γ pion virtual Compton scattering* A. Ocherashvili *et al.* , Phys. Rev. C **66**, 034613 (2002). Spires citations 3

[5.] *Measurement of the D_s^+ lifetime* M. Iori *et al.* , Phys. Lett. B **523**, 22 (2001). Spires citations 5

[6.] *Measurement of the Σ^- charge radius by Σ^- electron elastic scattering* I. Eschrich *et al.* , Phys. Lett. B **522**, 233 (2001). Spires citations 4

[7.] *Radiative decay width of the $a_2(1320)^-$ meson* V. V. Molchanov *et al.* , Phys. Lett. B **521**, 171 (2001). Spires citations 1

[8.] *Precision measurements of the Λ_c^+ and D^0 lifetimes* A. Kushnirenko *et al.* , Phys. Rev. Lett. **86**, 5243 (2001). Spires citations 19

[9.] *Total cross section measurements with π^-, Σ^- and protons on nuclei and nucleons around 600 GeV/c* U. Dersch *et al.* , Nucl. Phys. B **579**, 277 (2000). Spires citations 13

[10.] *Measurement Of The Σ^- Charge Radius In The Selex Experiment* J. Simon , Nucl. Phys. A **663**, 691 (2000). Spires citations 0

[11.] *Observation of the Cabibbo suppressed decay $\Xi_c^+ \to pK^-\pi^+$* S. Y. Jun *et al.* , Phys. Rev. Lett. **84**, 1857 (2000). Spires citations 14

[12.] *The SELEX phototube RICH detector* J. Engelfried *et al.* , Nucl. Instrum. Meth. A **431**, 53 (1999). Spires citations 20

Analyses and Schedule

current activities

- Systematics of Charm Hadroproduction from Different Beams (Σ^-, π^-, p)
- Ω_c^o Production

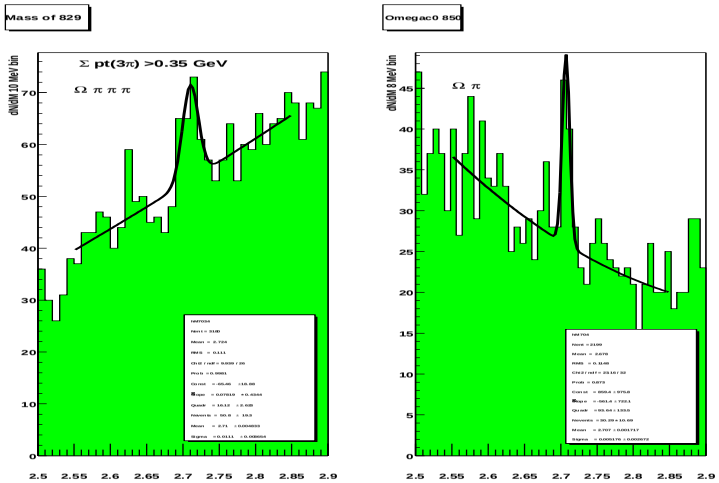


Figure 1: PRELIMINARY Selex Results

- Dalitz Plot Analysis of Clean Sample of $\Lambda_c^+ \to pK^-\pi^+$
- Study of Possible HQET Violation in $\Lambda_c^+ \to e^+\nu X$
- New Results on Double Charm States

Time Scale: through 2004/5

SELEX Theses

Thesis Work Now Underway:

- **Iowa**: 2 Ph. D. students - complete in 2004
- **San Luis Potosi**: 3 Ph. D. students - complete in 2004/5

Completed Ph.D. Theses

1. M. E. Mattson, "Search For Baryons With Two Charm Quarks," FERMILAB-THESIS-2002-03.
2. A. Y. Kushnirenko, "Precision measurements of the Λ_c^+ and D^0 lifetimes," FERMILAB-THESIS-2000-09.
3. M. Srivastava, "HadroProduction of Σ_c by a 600 GeV Σ^- Beam"
4. F. G. Garcia, "Hadroproduction of the Λ_c charmed baryon by the SELEX–E781 experiment," FERMILAB-THESIS-2000-40.

[5.] M. Kaya, "D_s Charm Strange Meson Production And Asymmetry," FERMILAB-THESIS-2000-37.

[6.] S. Ozkorucuklu, "Charged K/π Production Ratios With Σ, π And Protons On Carbon And Copper Targets," FERMILAB-THESIS-2000-33.

[7.] A. Ocherashvili, "Pion Virtual Compton Scattering," FERMILAB-THESIS-2000-41.

[8.] H. Krueger, "Untersuchung der elastichen Hadron-Elektronen-Streuung bei 540 GeV/c zur Messung es elektromagnetische Ladungsradius des Protons"

[9.] J. Simon "Messung des elektromagnetishe Ladungsradius des Σ^- bei 600 GeV/c"

[10.] K. D. Nelson, "Polarization Of Λ^0 Inclusively Produced By A 610-Gev/C Σ^- Beam," FERMILAB-THESIS-1999-55.

[11.] P. I. Pogodin, "Polarization Of Σ^+ Hyperons Produced By 800 Gev/C Protons On Copper And Beryllium," FERMILAB-THESIS-1999-54.

[12.] I. Eschrich, "Measurement of the Σ^- charge radius at the Fermilab Hyperon beam," FERMILAB-THESIS-1998-62.

[13.] U. Dersch, "Measurement Of Total Cross Sections Using Σ, P, π^-, and π^+ at 600 Gev/C Laboratory Momentum," FERMILAB-THESIS-1998-63.

[14.] K. Vorwalter, "Determination of the pion charge radius with a Silicon Microstrip Detector System"

[15.] P. P. Mathew, "Construction And Evaluation Of A High Resolution Silicon Microstrip Tracking Detector, And, Utilization To Determine Interaction Vertices," FERMILAB-THESIS-1997-18

SELEX has produced 10 M.S. Theses on topics independent of Ph.D. thesis subjects

Resource Needs for 2003-05

- Office space shared with CKM on 9E (4 desks). Move down from 13 when convenient

- SELEX code is served from an SGI machine (fn781a.fnal.gov) ; data are in ENSTORE. We took fn781a off maintenance one year ago. When it dies, we will need to shift web service, code repository, and other fn781a functions to fsgi01.fnal.gov or some other significant SGI platform. Some SGI machine of this class is needed at least through 2005.

- Continued access to data in ENSTORE needed through 2005.

Availability of SELEX Data to Others

- SELEX has extended invitations to join the collaboration to three different groups who had specific research topics they wanted to explore using SELEX data. Physicists from these groups will be added to the SELEX author list for publications that result from their research. SELEX publication policy will apply in such cases.

- The SELEX data have a very compact representation of physics quantities for certain topics. Outsider investigations of these topics can be done readily at the data level. Understanding acceptance and trigger conditions will require work with people within the collaboration.

We prefer to work with collaborators, rather than making the data broadly available to outsiders who have no obligation to the collaboration.

We are happy to entertain future requests of this sort.