Tracking Detector R&D at Cornell University and Purdue University

Cornell University	Purdue University
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We have requested funding for this research from NSF through UCLC.

Information available at the web site:

http://w4.lns.cornell.edu/~dpp/tpc_test_lab_info.html

* this presentation
* presentation to TPC meeting at Berkeley, 18-Oct-2003,
* presentation to UCLC meeting at Santa Cruz, 30-June-2002,
* project description from the NSF proposal, 29-August-2002

The project description can also be found at the UCLC site:

http://w4.lns.cornell.edu/public/LC/UCLC/projects.html

Detector Development, Cornell/Purdue Program

Systematic study **spatial resolution** and **signal width** using
GEM and MicroMegas TPC readout devices

details of spacings and gain,
pad size and shape
gas mixture
applied signal spreading

Spatial resolution and signal width studies using
traditional anode-wire-amplification read-out devices
Investigate a readout using smaller wire spacing to reduce the **ExB** effects.
Establish a baseline for the MPGD studies.

Ion Feedback measurements
Instrument the high voltage plane, or an intermediate grid.

Tracking studies in a **high radiation environment**

Tracking studies in a **magnetic field**
Cornell has the expertise and utilities to build and operate a superconducting test magnet.

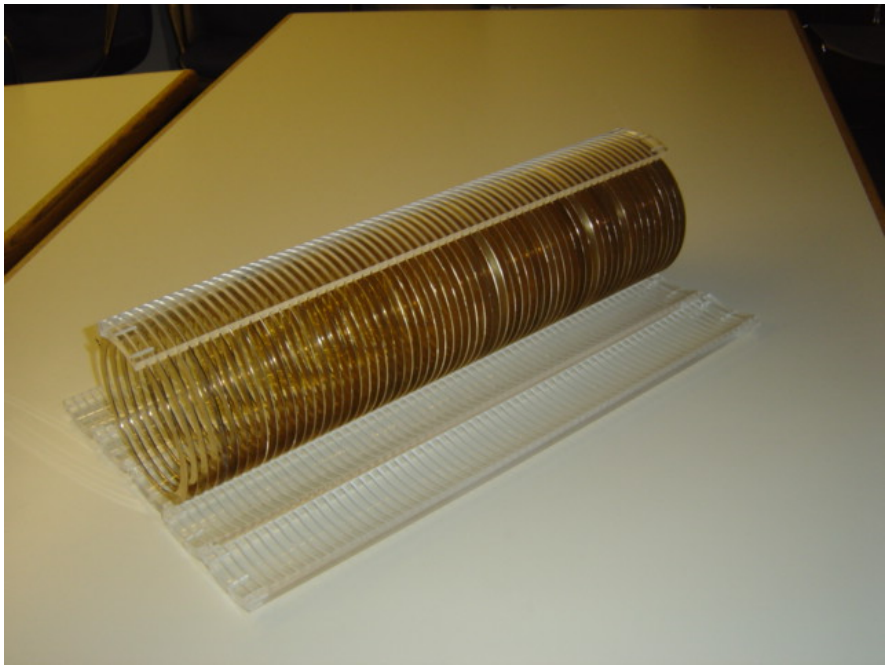
TPC Test Chamber R&D at Cornell University and Purdue University 3 Year Plan, from UCLC proposal

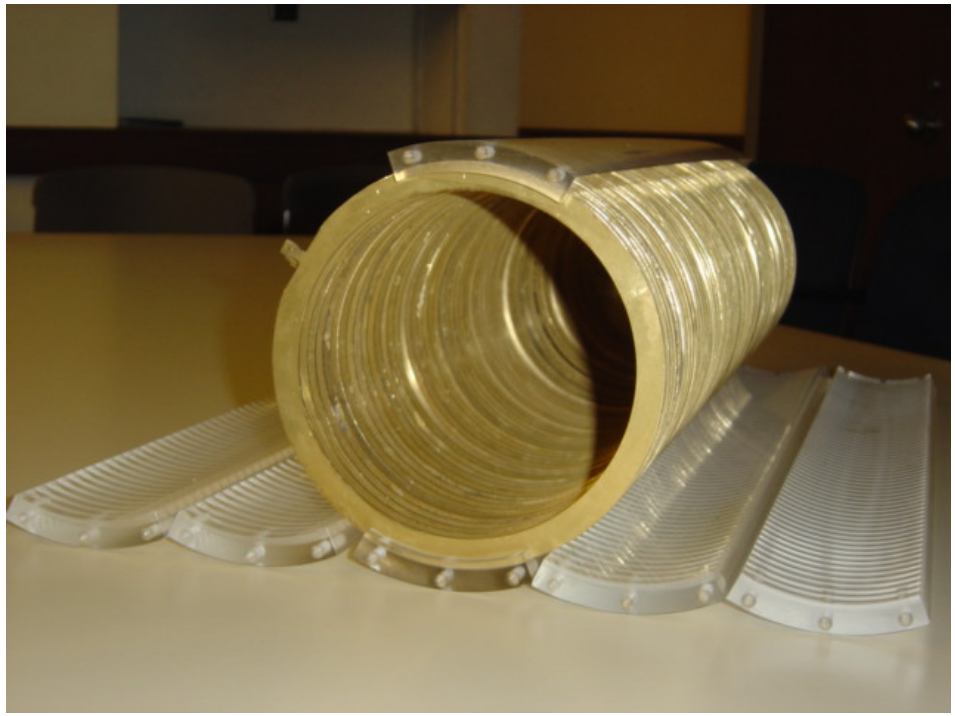
		Plan	Purchases	
(at Cornell)	1st Year	track definition scintillator trigger small drift chambers test device, TPC power supplies data acquisition	VME crate Computer and LabView controller discriminators for drift chambers TDCs for drift chambers FADCs for TPC (limited) power supply frame power supplies electronics boards	$ 52,000 equipment
	2nd Year	expanded TPC superconducting magnet	expanded DAQ	$ 121,000 equipment
	3rd Year	expanded TPC superconducting magnet	expanded DAQ	$ 74,000 equipment
(at Purdue)	1st Year	MPGD readout modules	printed circuit pad readout planes GEMs, MicroMegas	$ 10,000 equipment $ 16,000 student support
	2nd Year	advances in MPGD readout modules		$ 10,000 equipment $ 16,000 student support
	3rd Year	advances in MPGD readout modules		$ 10,000 equipment $ 16,000 student support

Short Term Activities

Cornell: Construct a first TPC device,
greatly influenced by the Victoria design.

14.6 cm ID field cage for a 10 cm GEM
60 cm field length
22.2 cm OD outer structure





Short Term Activities

Cornell: Electronics Purchase: Lab funds, Sept 2003

VME Crate and Interface
Struck FADC, 100 MHz, 32 channels
CAEN HV crate and interface
HV supplies: for GEMS (2 kV)
for TPC Drift (20 kV) ~66cm

Set-up and testing of electronics (complete delivery by end of January)

Construct a first TPC device. (started, previous slide)
Construct telescope drift chambers and trigger scintillators.

Technical staff and machine shop staff are available,
some residual competition from the CESRc Wiggler production.

Purdue:

Ready to construct a readout module.