# Preparations for TRIUMF beam test

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## Schedule

- We are scheduled to run Nov 17 (PM) thru Dec 5, but the T2K group before us will not be ready for the beam, so this might get moved up to Nov 14 or even earlier. They would like a couple of days of running time at the end. Tentatively:
  - setup Nov 14 16
  - run Nov 17 Dec 2
  - T2K Dec 3 5
- We have four students, two faculty, and two techs to take shifts. I believe it will take two people to move or rotate the chamber.



### • Chamber is complete

windows are 25µ aluminum. Covered by frames and mylar for protection.



## Chamber

- Rocky has been testing gain and noise performance using the slow integrating ORTEC amplifier system used for the aging studies.
  - two different gases
  - terminated or not
  - try breaking possible HV ground loop.
- Hope to receive fast amplifier prototype from Jean-Pierre ~Nov 9. We will need to build holder for preamp once we have it in hand.

# Trigger / Time-of-flight

- Jerry Va'Vra has lent us four Burle micro-channel PMTs to use in a trigger / time-of-flight system.
- We have tested them with scintillator and Sr90. All work, but it looks like we need to use LeCroy 10x PM-amplifiers.
  - pulse height goes from  $\sim 60 \text{ mV} \rightarrow 600 \text{ mV}$
  - rise time goes from 1.9 ns  $\rightarrow$  2.5 ns
  - rise time divided by (S/N) improves by  $\sim 2.5 \times$
- Use both constant-fraction discriminators / TDC and switched-capacitor array readout.
- Philip and Steve Chan (scintillator shop) are making two scintillator counters (BC-404) out of these.

### BURLE

### TENTATIVE DATA November 2002

The 85011 assembly is based on a new photomultiplier tube that uses microchannel plates (MCP) for electron multiplication, the PLANACON™. This 2" square head-on MCP-PMT is very low profile, less than one inch thick including the voltage divider network. The sixty-four anodes provide 6mm position resolution when used as a discrete pixel device. Improved resolution can be obtained using the charge-sharing technique with an alternate voltage divider network. The dual MCP multiplier provides excellent time response, good gain, and extremely high pulse linearity. Response uniformity over the full 2" square active area is exceptional, typically 1:1.5. The assembly comes with terminated



**PLANACON™ PHOTOMULTIPLIER** 

TUBE ASSEMBLY 85011-501

anode and high voltage cables for ease of use. Applications include specialized medical imaging, ring imaging Cherenkov counters, fluorescence microscopy, and high-speed applications such as LIDAR.

### GENERAL

	Parameter	Value	Unit
Spectral Response		165 to 660	nm
Wavelength of Maximum Response		410	nm
Photocathode Material		Bialkali	
Window	Material	Quartz	
	Thickness	0.080	in
Multiplier	Structure	MCP (25µm pore, 40:1 L:D)	
	Number of Stages	2	
Anodes	Number	64 (8 x 8)	
	Size / Pitch	0.234 / 0.254	in
Voltage Divider Resistance		12	MΩ

### Maximum Ratings (Absolute Maximum Values)

	Parameter	Value	Unit
Supply Voltage	Between Anode and Cathode	2400	Vdc
Average Anode Current, surr	of all anodes	3	μA
Ambient Temperature		- 40 to + 70	С

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83112-501 & 83112-502 / NOV 2002

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### BURLE

### PHOTOMULTIPLIER TUBE 85011-501

### Characteristics (at 25 °C)

Parameter			Тур.	Max.	Unit
Cathode Sensitivity	Luminous	40	55		µA/Lm
	Blue (with CS-5-58 filter)	5.5	7.5		µA/Im-b
Anode Sensitivity	Luminous		35		A/Im
Modal Gain	Modal Gain				
Anode Dark Current, Sum of		0.5	5	nA	
Time Response	Anode Pulse Rise Time		0.3		ns
	Anode Pulse Width (FWHM)		1.8		ns
Pulse Linearity at 5% Deviat		300		mA	
Single Electron Response	Peak-to-Valley		2:1		
	Resolution (FWHM)		150		%
Anode Uniformity		1:1.25	1:1.5		
Pulse Height Resolution, 2" I		10.0		%	

Note: Measured with the condition shown in Table 1 except where noted.

Table 1 VOLTAGE DISTRIBUTION RATIO AND SUPPLY VOLTAGE ( -2300 Volts )

Electrodes	ŀ	<	M	CP <sub>in</sub>	MC	Pout	F	2
Ratio			1	1	0		1	

Supply Voltage : 1000Vdc, K : Cathode P : Anode



I.D. BY ROW-COLUMN, ALL UNIDENTIFIED PINS ARE AT GROUND POTENTIAL.



# DAQ

- Requested a MIDAS system that includes:
  - two CAEN V1729 switch-capacitor arrays (1 for TOF, 1 for DCH)
  - one CAEN V1190B TDC (for TDC)
  - one digital voltmeter for temperature and pressure transducer.
- The SCAs are the non-standard part.
- Hopeful the DAQ group will just make this happen.

## Gas system

- Should not be a problem. Robert Openshaw is aware of our needs and schedule.
  - although he did say he will need to look for mass flow controllers.
- 80:20 and 90:10 He:Isobutane. Anything else?



• Begin construction next week, after completion of scintillator counters



# Alignment

• Plan is to use laser level to align centers of DCH and two scintillator counters to within 1 mm.

## Shifts

- If we run 24 hours a day, there will be 46 8-hour shifts of data taking (Nov 17 – Dec 3, 16 days).
- I think it will take two people to move or translate the chamber.
- We have four students, two faculty, and some part of Wayne and Philip to take shifts. I don't think we can run two people for three shifts a day.
- Maybe use only two shifts per day: 1 person on day shift, with Wayne or Philip on call, plus two on afternoons.

 $\Rightarrow$  16 shifts with 1 person, 16 shifts with 2 people