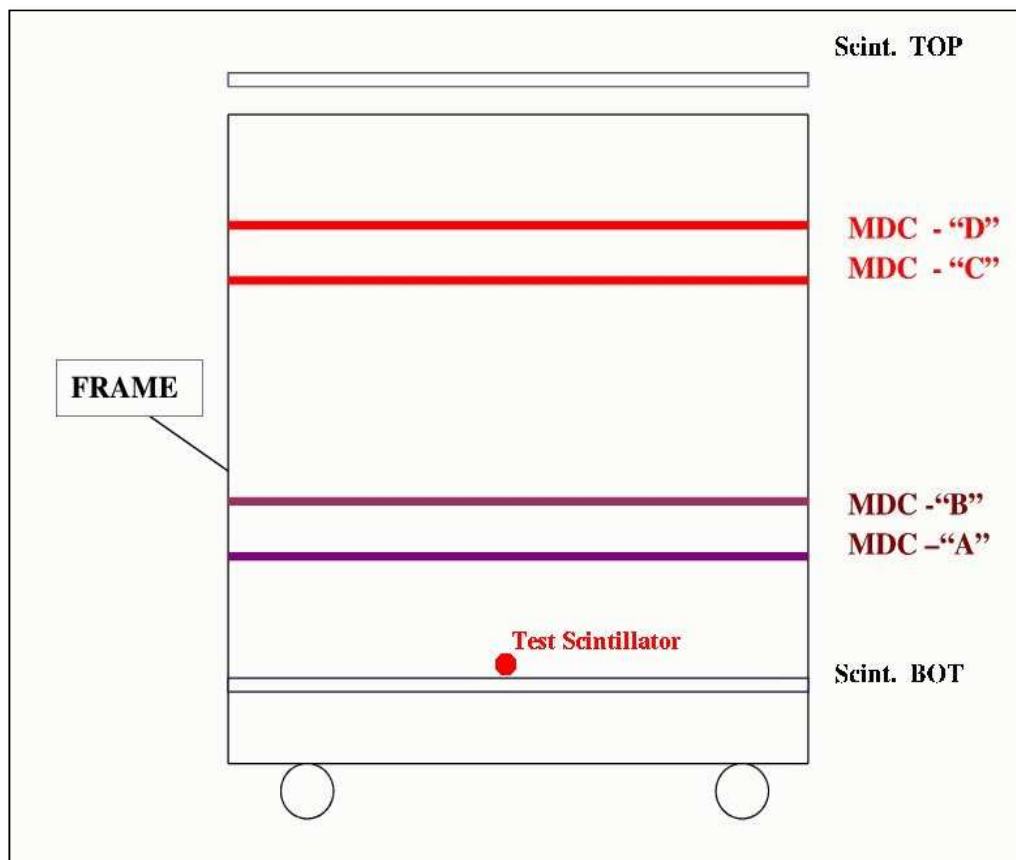


*Forward Tracking Hodoscope
Status Report*

*M. Khandaker
SANE Collaboration Meeting IX
December 9, 2005*

Quartz Bar Test Setup

- *Two Saint-Gobain Quartz Spectrosil 2000 bars obtained ($350 \times 5 \times 3 \text{ mm}^3$).*
- *Study photo-electron yield, attenuation along bar length.*
- *Use test setup in JLab/EEL for GEP-III drift chambers.*

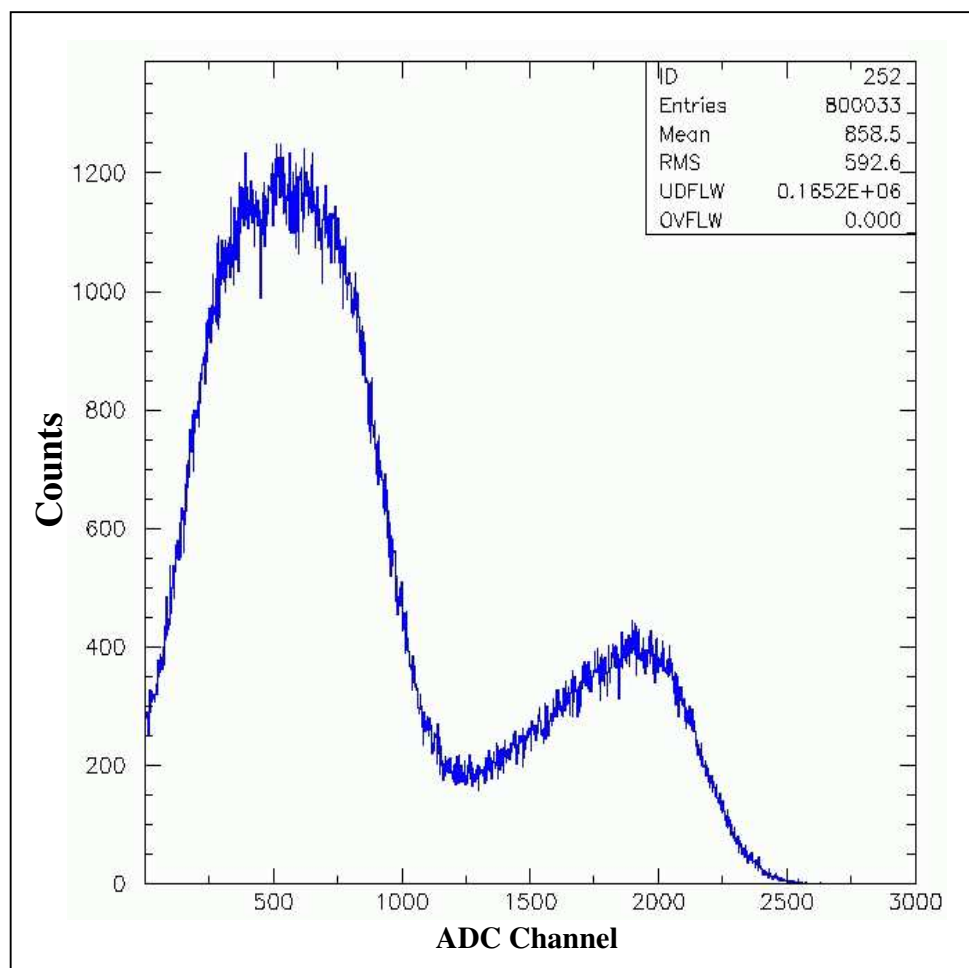


Preliminary Test Results

- *Initial tests with a $\sim 150 \times 5 \times 3 \text{ mm}^3$ bar.*
- *^{106}Ru source (3.5 MeV endpoint β) and trigger scintillator.*
- *10 mm \varnothing Hamamatsu R1635 PMT attached at one end.*
- *Pulse heights clearly visible but small, 2-5 mV.
(Scintillator, instead of Quartz, gave 5-20 mV signals.)*
- *No noticeable attenuation of pulse heights along length of the bar was observed (from oscilloscope trace).*
- *More quantitative tests with cosmic rays and the GEP-III setup underway.*

Test Results with Scintillator

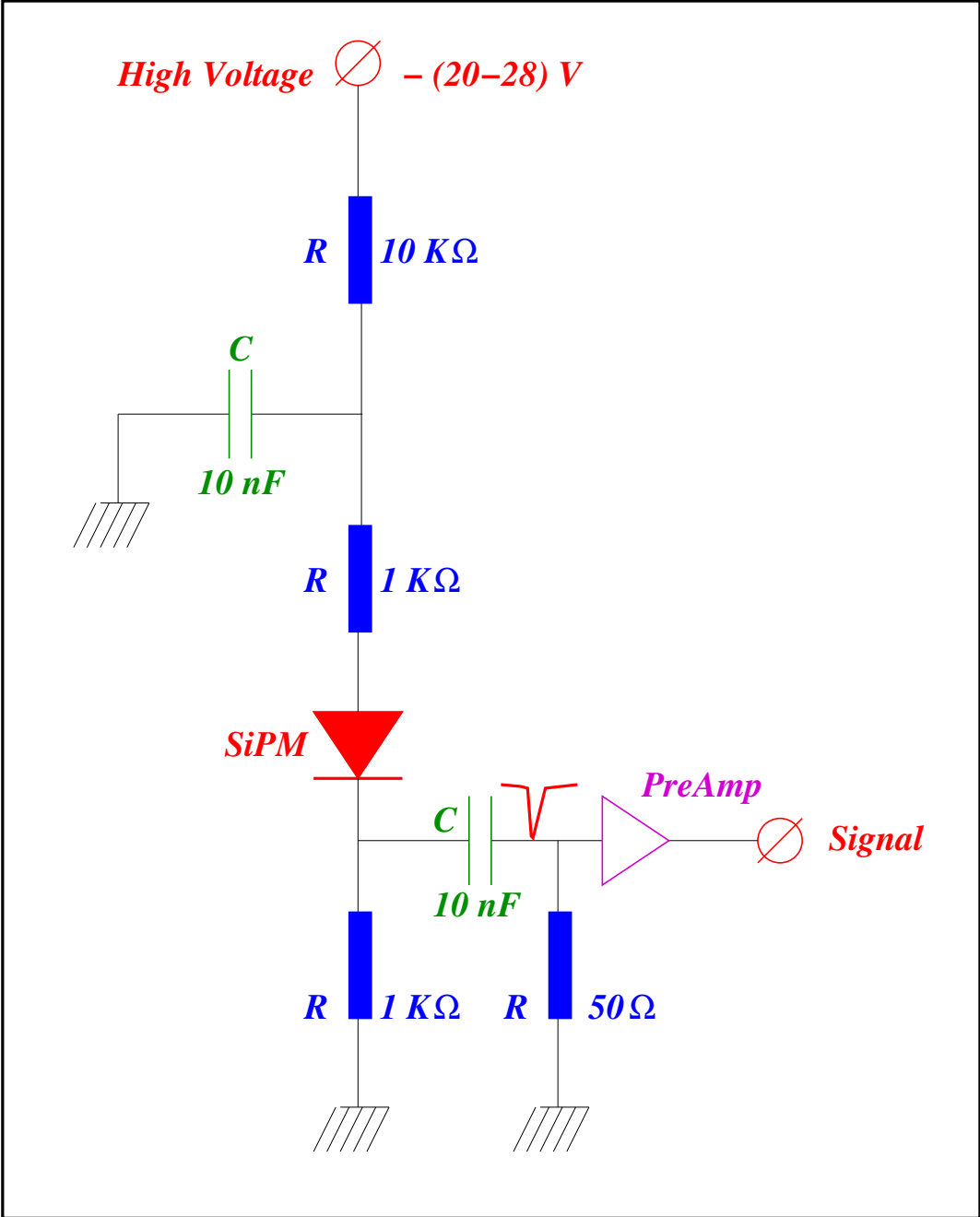
- *Cosmic ray tests with scintillator ($\sim 150 \times 10 \times 10 \text{ mm}^3$) and R1635 PMT.*
- *GEP-III DAQ setup with LeCroy 1881M Fastbus ADC.*
- *Scint_TOP \times Scint_BOTTOM provided the trigger.*
- *Need to understand DAQ setup and data analysis better.*



Larger Area SiPM Characteristics

- *3×3 mm² SiPM from MEPhI:*
 - *Multipixel Geiger mode photodiode with common readout.*
 - *Sensitive area 3×3 mm² (5625 pixels).*
 - *High gain $\sim 1-2 \times 10^6$.*
 - *Working voltage $\sim 20-28$ V.*
 - *Excellent timing resolution ~ 65 ps for single photoelectron detection.*
 - *Fast risetime ~ 1 ns.*
 - *Single pixel recovery time ~ 1 μ s.*
 - *After pulsing probability ~ 1 %.*
 - *Dark rate (temperature and gain dependent) \sim MHz/mm².*
 - *Reasonably low cost \sim \$100/unit.*
- *15 units have been obtained.*
- *Tests with quartz bar and GEP-III setup to be done.*

SiPM Electronics Schematic



SiPM Amplifier

- *Very low noise amplifier crucial for SiPM.*
- *Hall B DVCS test setup for APD, will not work for SiPM.*
- *Sergey Kuleshov (ITEP) and Yuri Efremenko (Univ. of Tennessee) has amplifier developed for SiPM (SiLite Co.).*
- *Amplifier unit will be available in a few weeks for tests.*
- *SiLite developing $3 \times 3 \text{ mm}^2$ MRS operable in blue region, will be available in a few months.*

