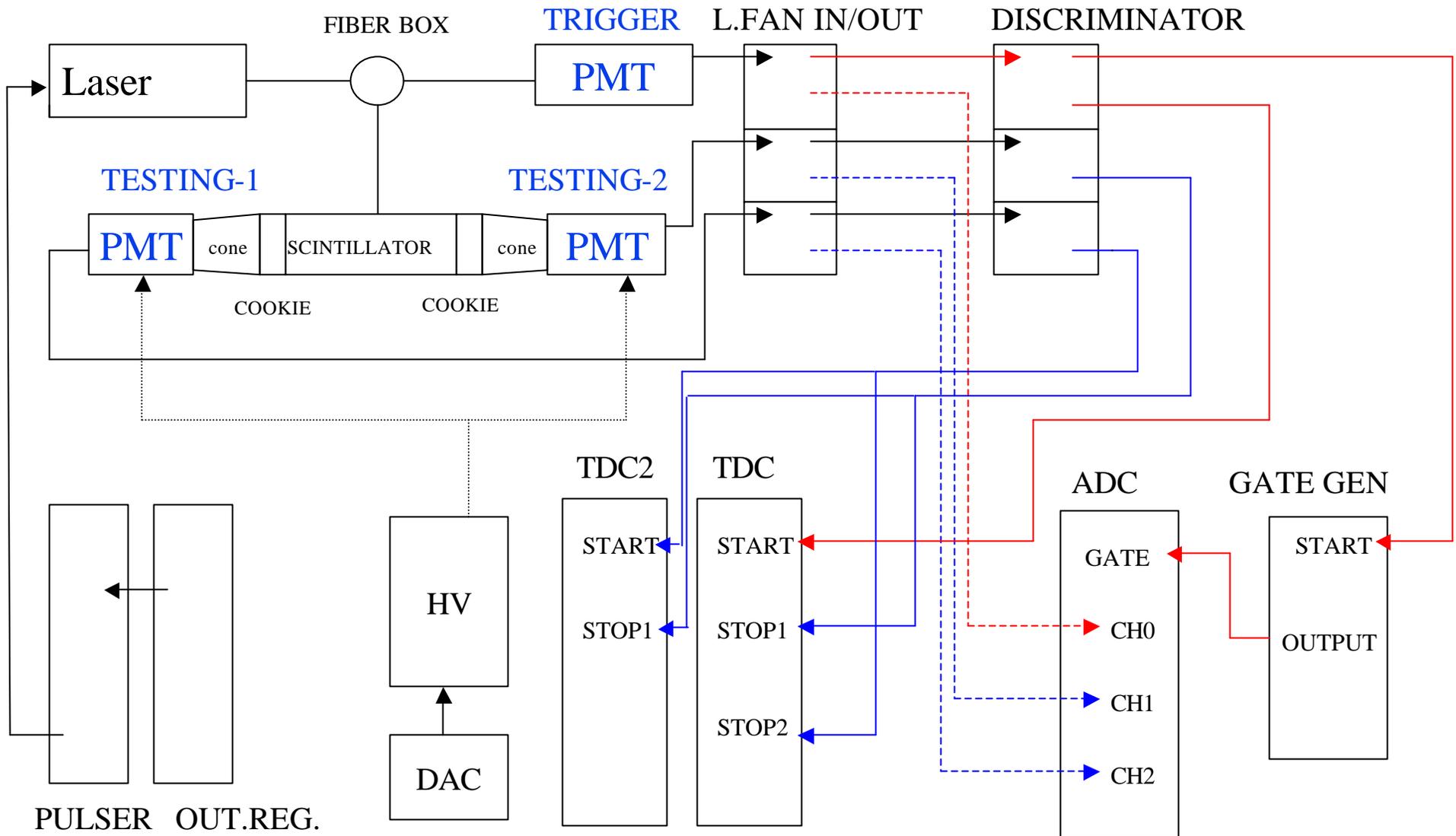


PMT Calibration @ FNAL (status report)

Y. Oh, I.Vila and S.Cabrera

- Outline
 - Test layout (a new 19-stages PMT used as Trigger.).
 - Gain measurements.
 - Light Output normalization
 - Inside/outside the magnet
 - Timing resolution.
 - Laser trigger rate studies.
 - Calibration Steps (time budget).
 - Conclusions.

PMT Calibration @ B0: current setup



Gain Measurements: Light output normalization

- Renormalizing the ADC spectrum from the testing PMTs using the monitor PMT

Discrimination threshold (mVolts)	Gain exponent before normalization (B=0)	Gain exponent after normalization (B=0)
50	8.8	8.4
100	8.8	8.5
150	8.6	8.4
200	8.1	8.4
250	7.7	8.4

Gain measurement: outside/inside magnet.

PMT S/N	FNAL	TSUKUBA	PEN
DA0019	9.0	8.7	8.8
DA0012	8.4	8.4	NA

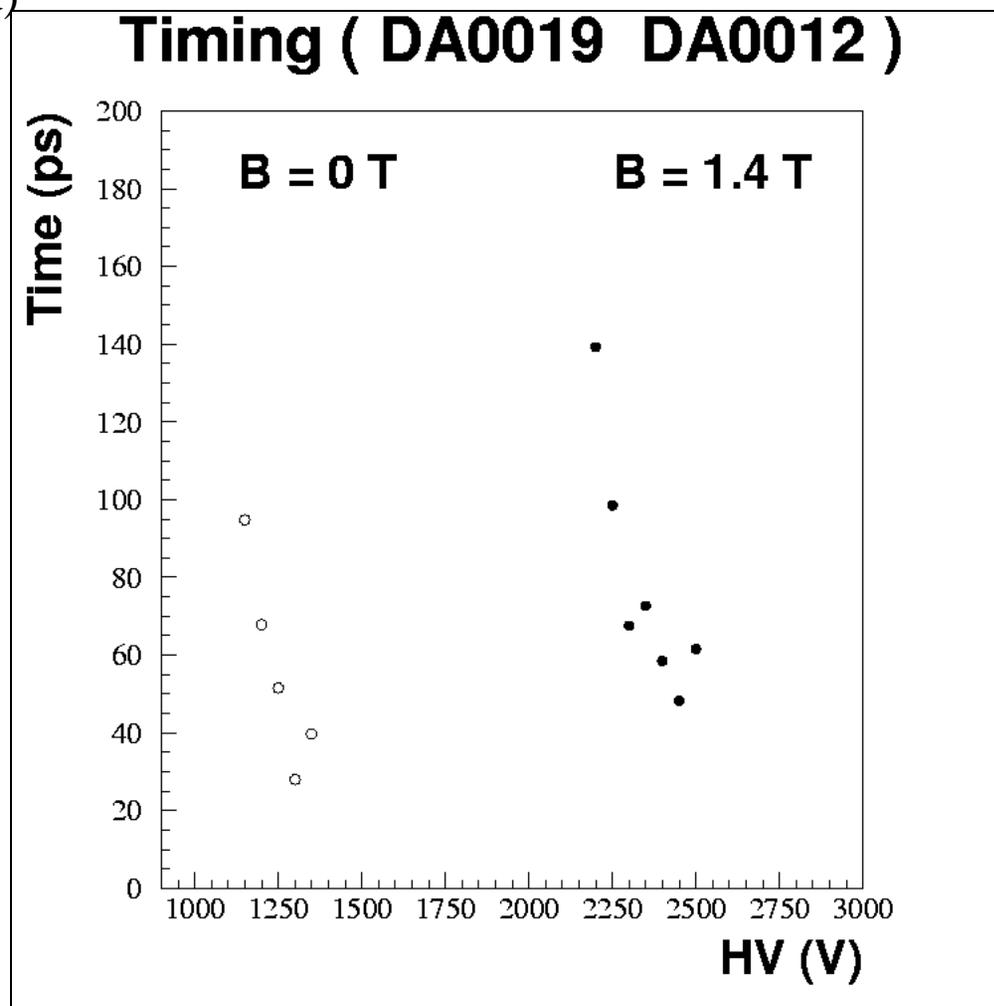
B=0T

PMT S/N	FNAL	TSUKUBA	PEN
DA0019	8.2	6.8	NA
DA0012	7.4	7.9	NA

B=1.4T

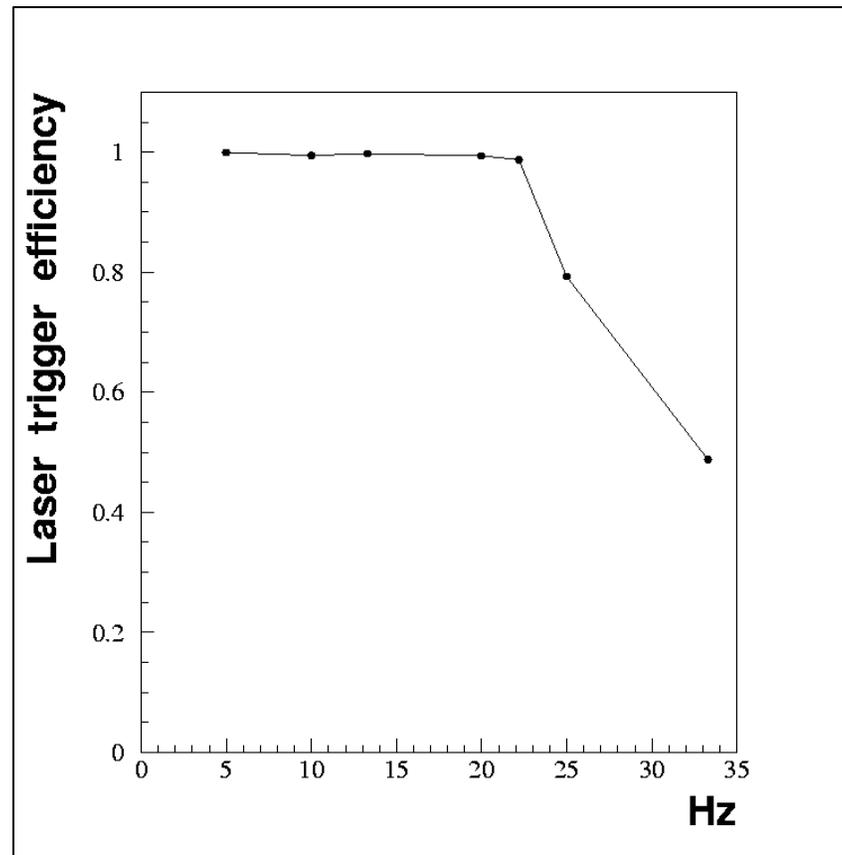
Timing resolution

- Distribution width of the two testing PMTs arrival time difference ($\sqrt{2}$ not yet included)



Laser trigger rate studies

- We have externally triggered the laser, the signal from the trigger triggered the scope. The ext. trigger efficiency is determined by the ration between the num. of scope triggers over the num. of laser triggers.



Calibration Steps (time budget)

- For each *pair* of PMTs:
 1. Pmt Assembly ~ 20 min.
 2. Setting up light output (compare cosmic pulse and laser pulses) ~ 10 min.
 3. Testing outside magnetic field (~ 2min/HV point). For 8 scanned points ~ 15 min.
 4. Testing inside magnetic field (~ 2min/HV point). For 8 scanned points ~ 15 min.)
- The **total time** per pair is ~ 1hour.

Conclusions

- The test stand is ready for PMT test production. (the pmt-fiber holder is going to be ready in a few days, end of the week, beginning next week)
- We have a good understanding of our setup.
- A calibration rate ~ 16 PMTs.
- Still we need to refine the analysis to calculate other parameters (num. Photoelectrons, Amp. Vs. time dependency,...)