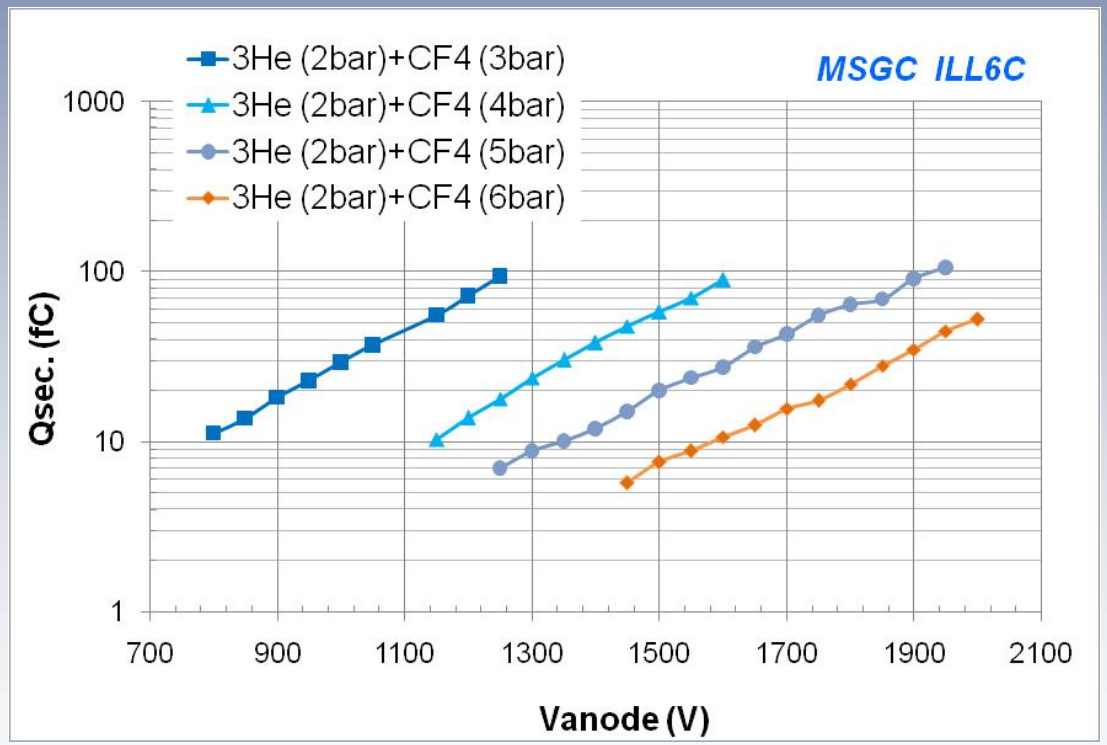
Preliminary Measurements with MSGC ILL6C

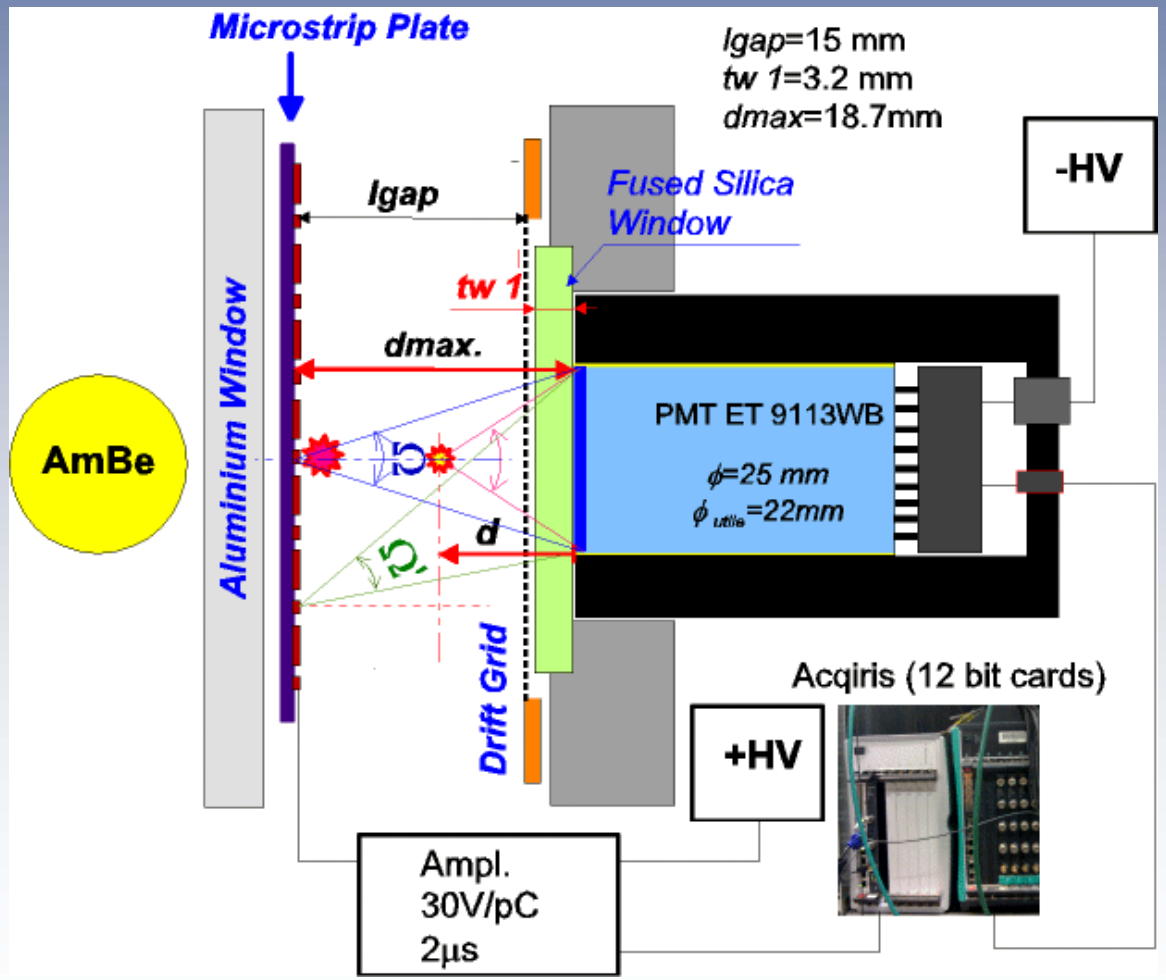
Charge multiplication gain @ 5, 6, 7 and 8 bar (total pressure)



- We don't have observed discharges
- The maximum value show for $Q_{sec.}$ (gain~30) was limited by the Saturation on the Amplifier
- Considering the approximation *fwhm*=0.7Rp:
  6 bar CF4 $\Rightarrow$ *fwhm*~0.5mm

Preliminary Measurements with MSGC ILL 6C

Signal Acquisition/ACQIRIS

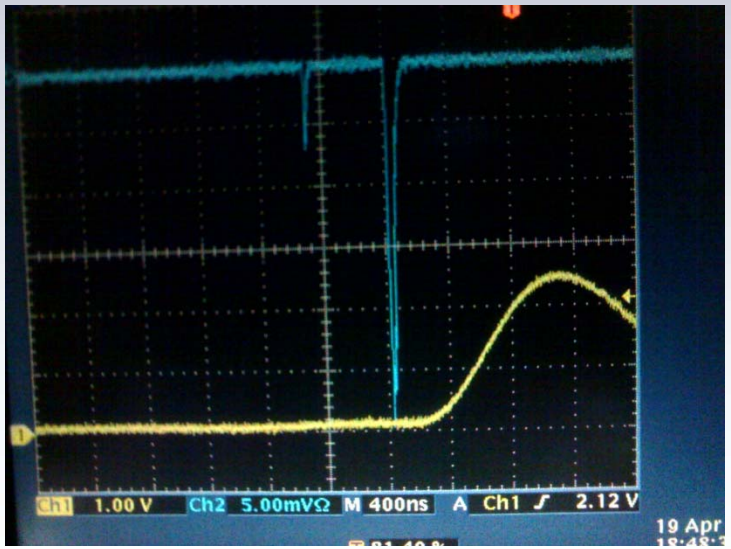


ACQIRIS settings

Ch1: PMT signals; Ch2: Anodes Signals
Time window=3µs; Trigger Delay=-2 µs
Trigger Level (Ch2)=300mV
Sampling Rate=200MS/s

Detector settings

Drift @ -HV
Cathodes @ GND and Anodes @ +HV



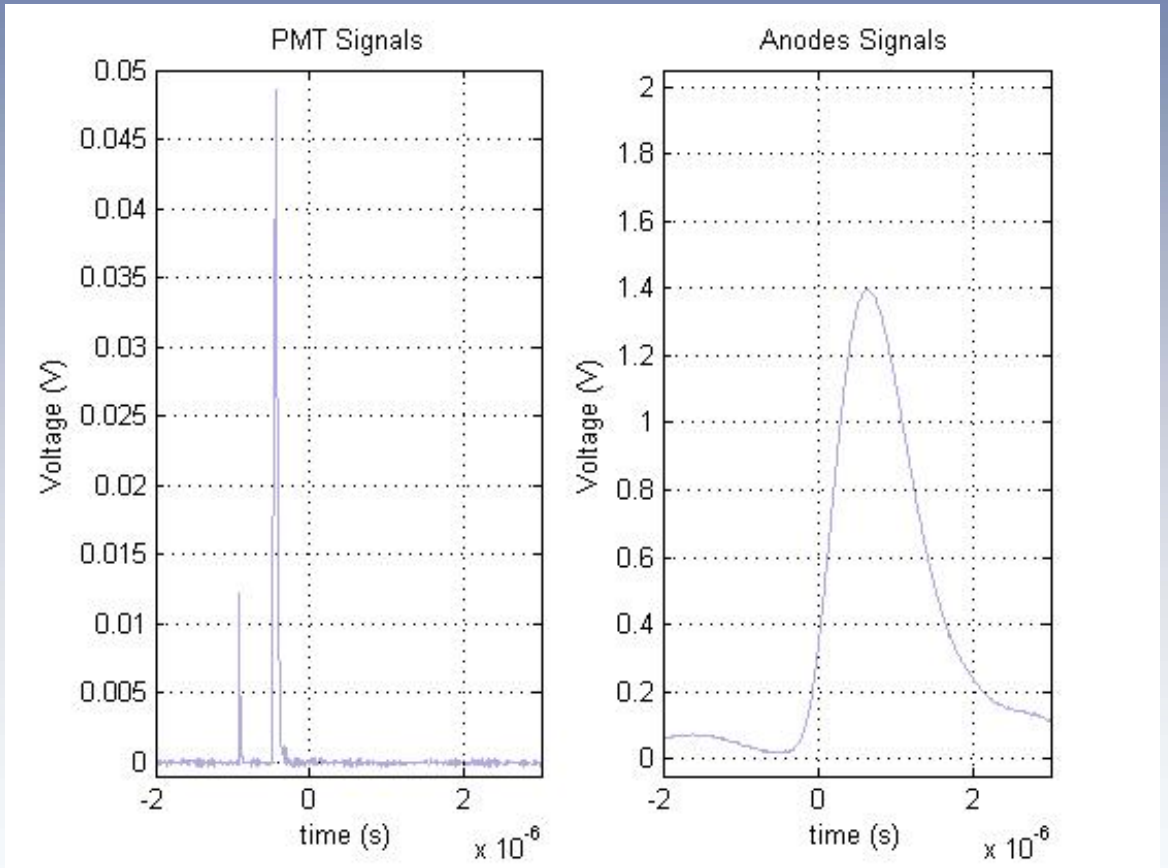
Preliminary Measurements with MSGC ILL 6C

Signal Acquisition/ACQIRIS

^{3}He (2bar)+CF_4 (5bar)

PMT 9113WB
V_{PM}(V) = -1100V

VD=-500V; VC=0;
Va=+1750V
*Full energy peak (*764keV)
@ch75



Typical signals

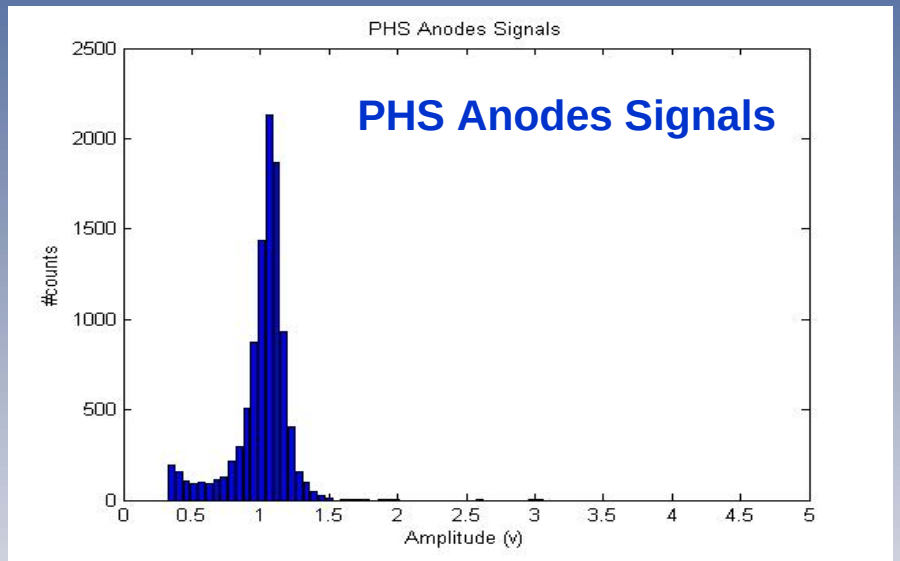
Preliminary Measurements with MSGC ILL 6C

Signal Acquisition/ACQIRIS

^{3}He (2bar)+CF_4 (5bar)

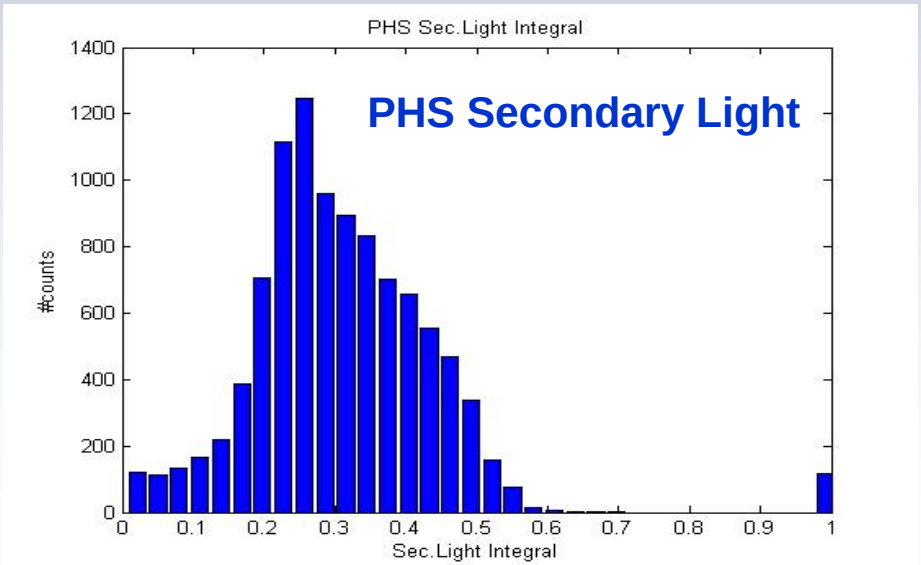
PMT 9113WB
V_{PM}(V) = -1100V

VD=-700V; VC=0; Va=+1750V
*Full energy peak (*764keV) @ch75



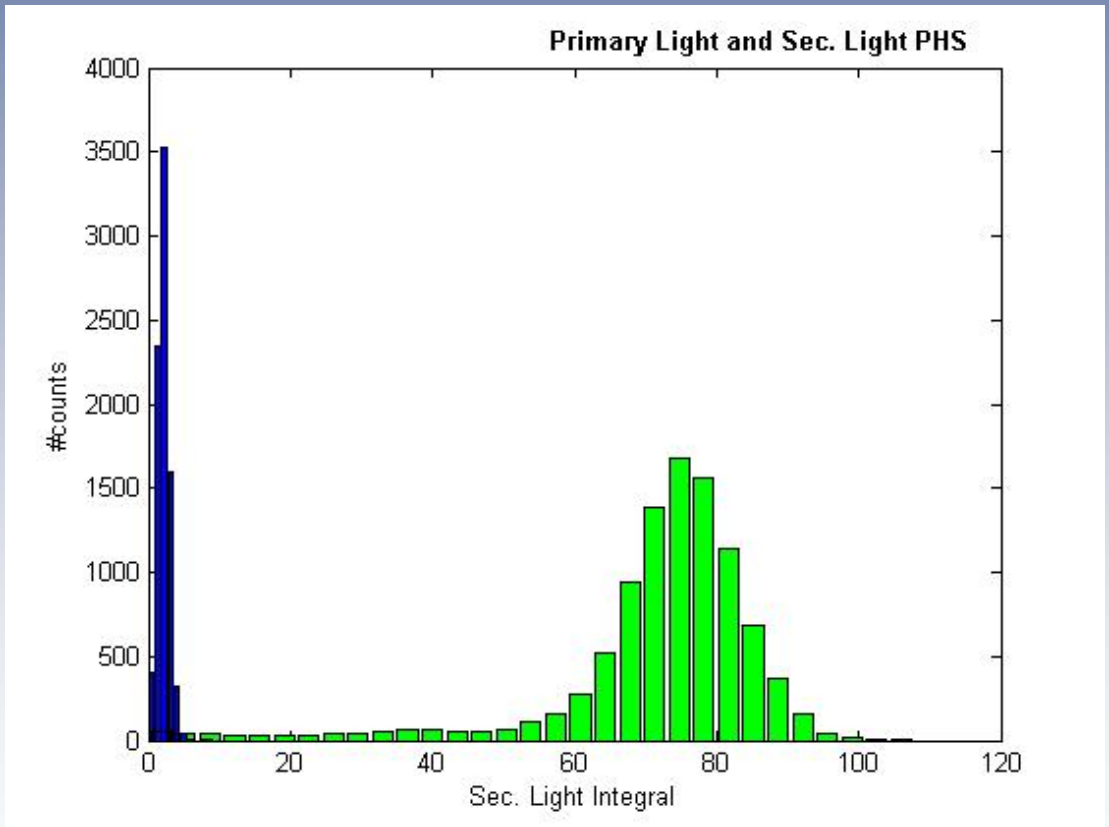
AmBe source (no collimation)

Spread in the solid angle subtended by the PMT



Preliminary Measurements with MSGC ILL 6C

Signal Acquisition/ACQIRIS – Previous Measurements with an Collimated Beam (CT2)



The measurements we made on a beam line didn't show the solid angle effect

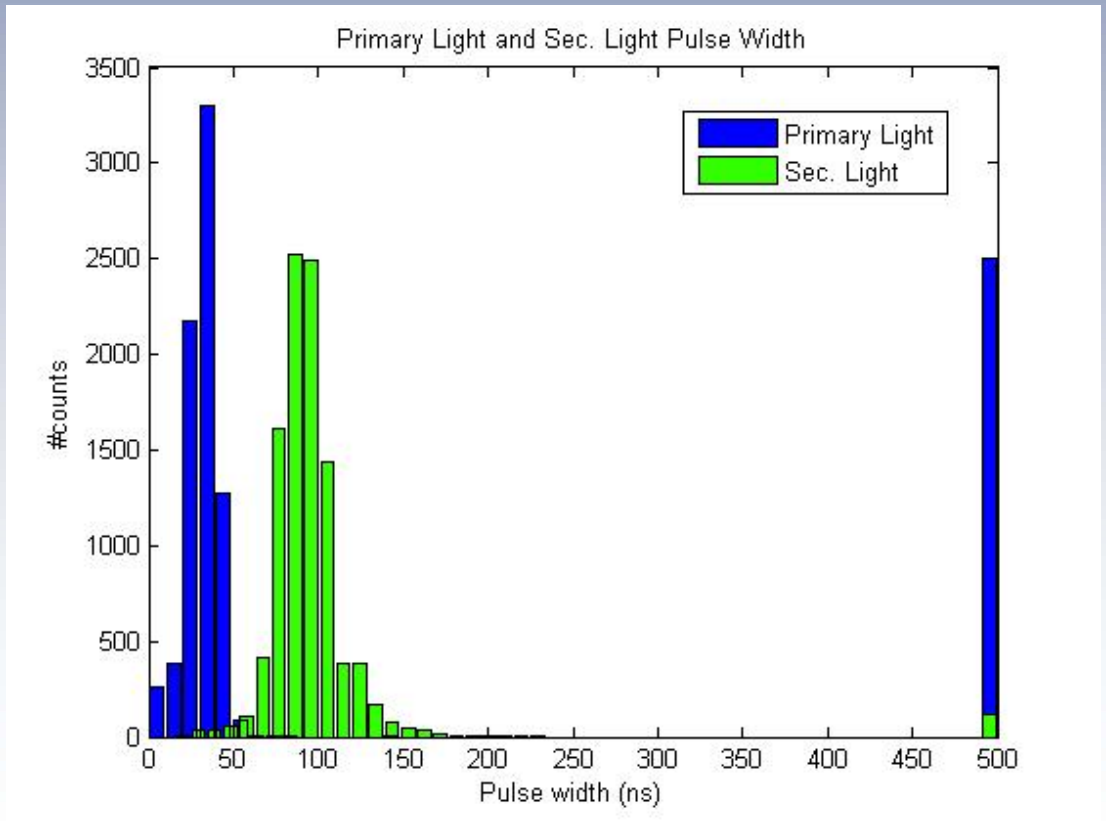
Preliminary Measurements with MSGC ILL 6C

Signal Acquisition/ACQIRIS

TOT (1mV) for Primary and secondary light pulses

^{3}He (2bar)+CF_4 (5bar)

PMT 9113WB
V_{PM}(V) = -1100V
VD=-700V; VC=0; Va=+1750V
*Full energy peak (*764keV) @ch75



Preliminary Measurements with MSGC ILL 6C

- The detector is operational at 8 bars
- It is a very clean setup
- Problems of stability with the D263 glass impose using the Schott S8900 glass for precise measurements

Future Work

- Comparison between PMTs
- Study versus drift field
- Stability study versus gas purity
- Other MSGCs (in particular Schott S8900, ITO ?)

Thank You

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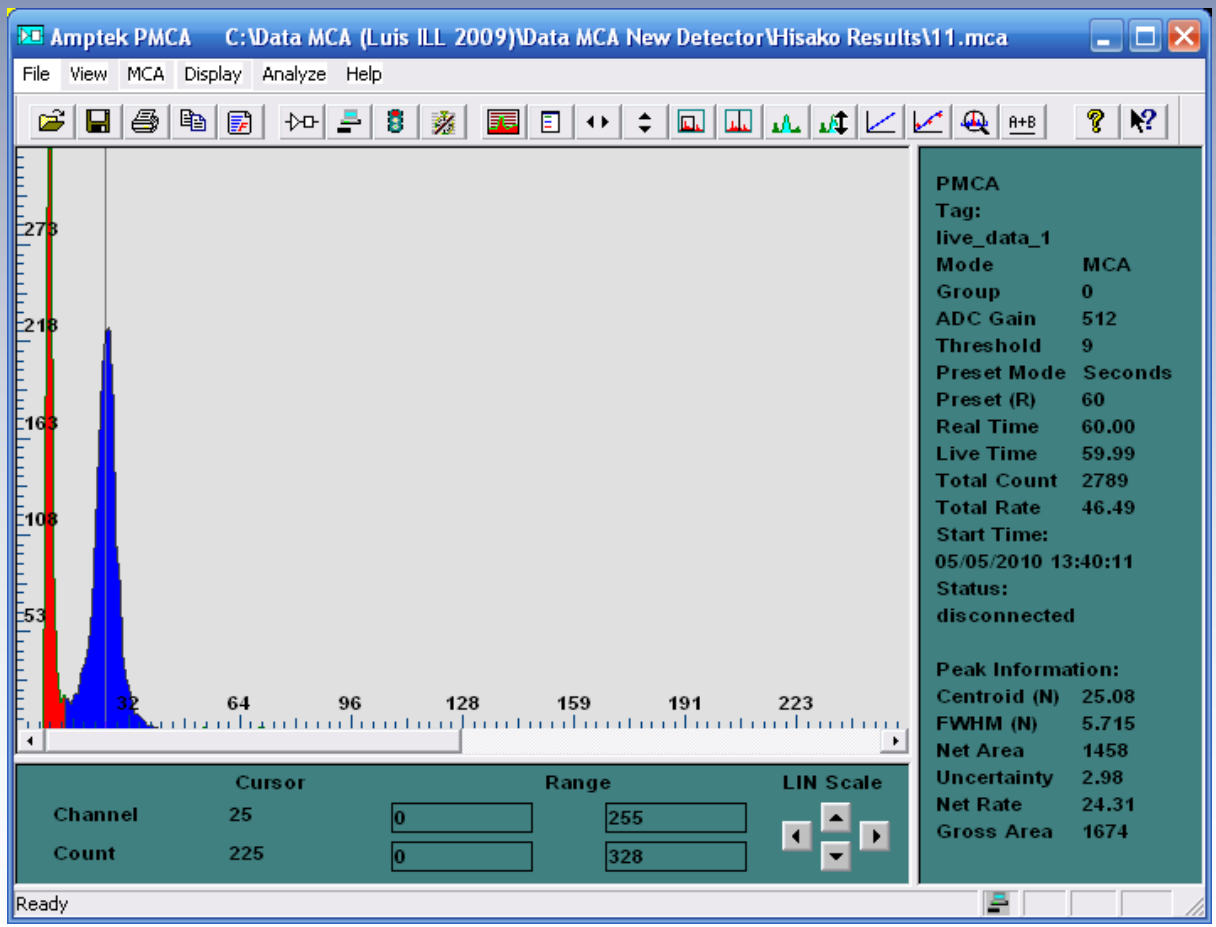
Preliminary Measurements with MSGC ILL 6C

PHS Anodes signals – 6 bar CF4

^{3}He (2bar)+CF_4 (6bar)

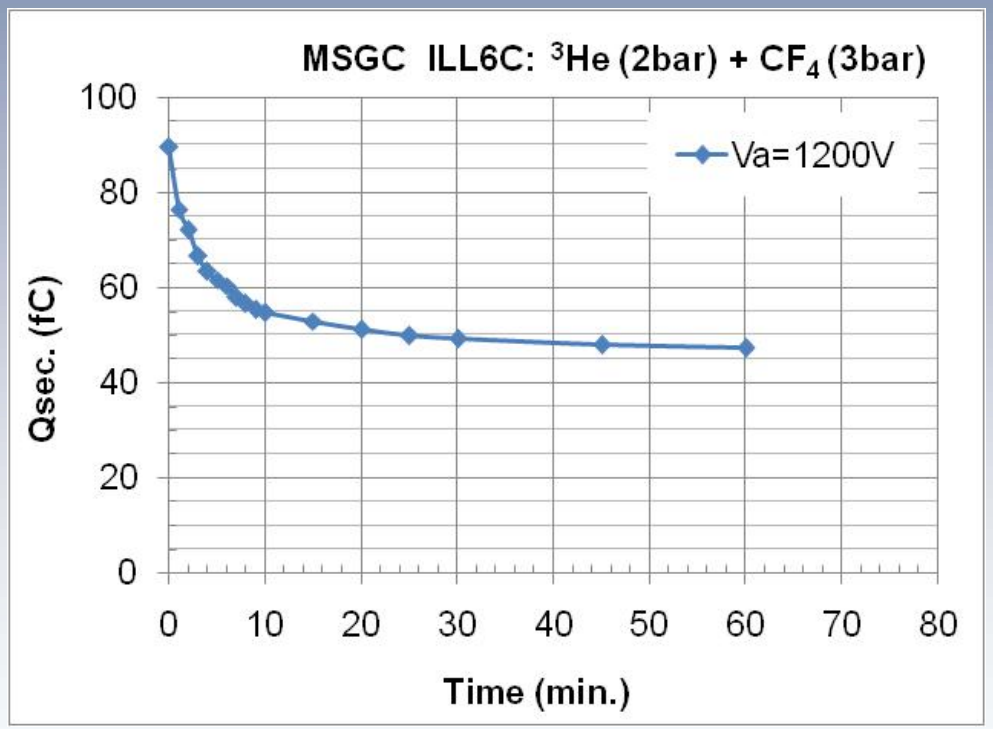
VD=-800V; VC=0; Va=+2100V
*Full energy peak (*764keV) @ch25

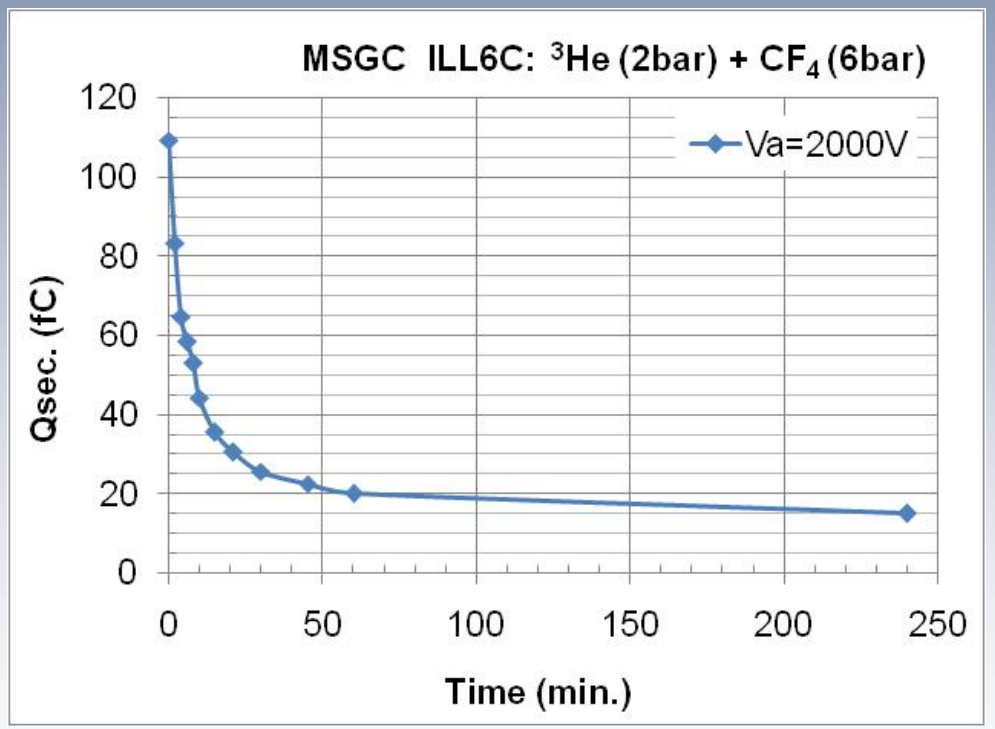
Obs.: After 4 hours with Va=2100V



Preliminary Measurements with MSGC ILL 6C

Gain stability





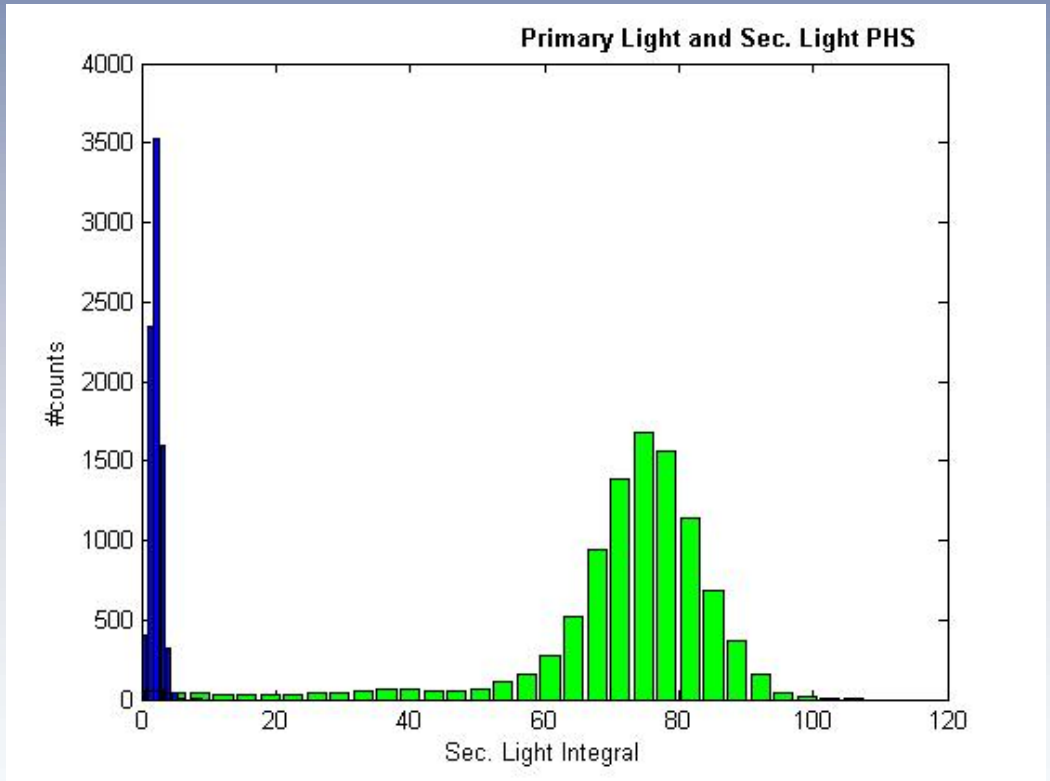
Preliminary Measurements with MSGC ILL 6C

Signal Acquisition/ACQIRIS – Previous Measurements with an Collimated Beam (CT2)

^{3}He (2bar)+CF_4 (3bar)

PMT EMI 9125A
V_{PM}(V) = -950V

Virtual Cathode MS on BIDIM80
Collimated Beam (CT2)
Va=+1300V
*Full energy peak (*764keV) @ch78
Gain ~14

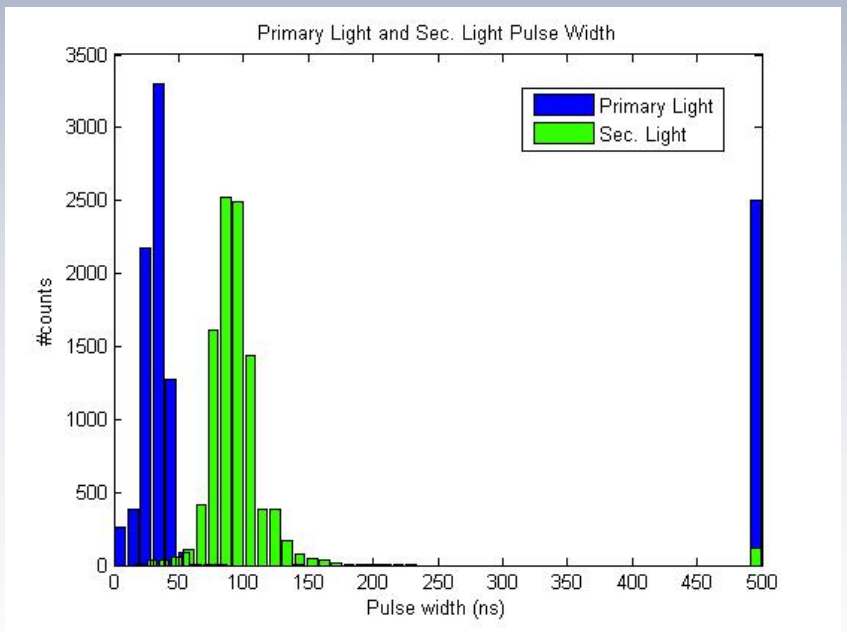


Preliminary Measurements with MSGC ILL6C

Signal Acquisition/ACQIRIS

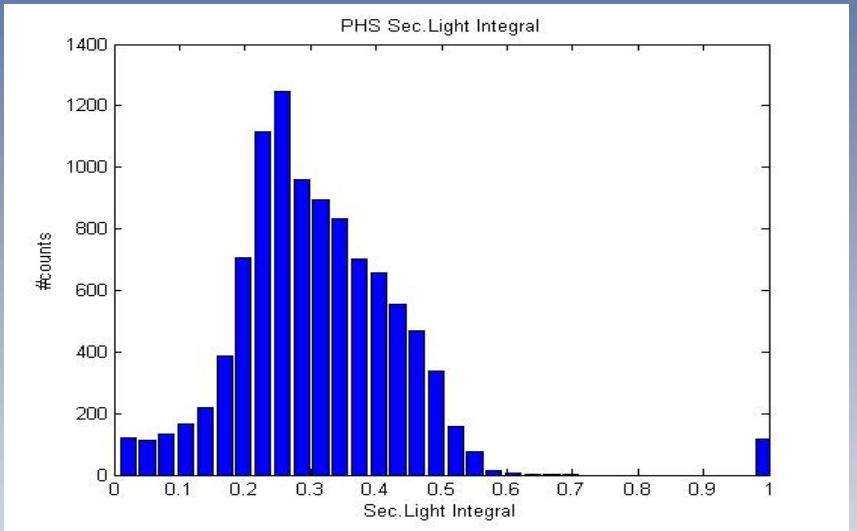
^{3}He (2bar)+CF_4 (5bar)

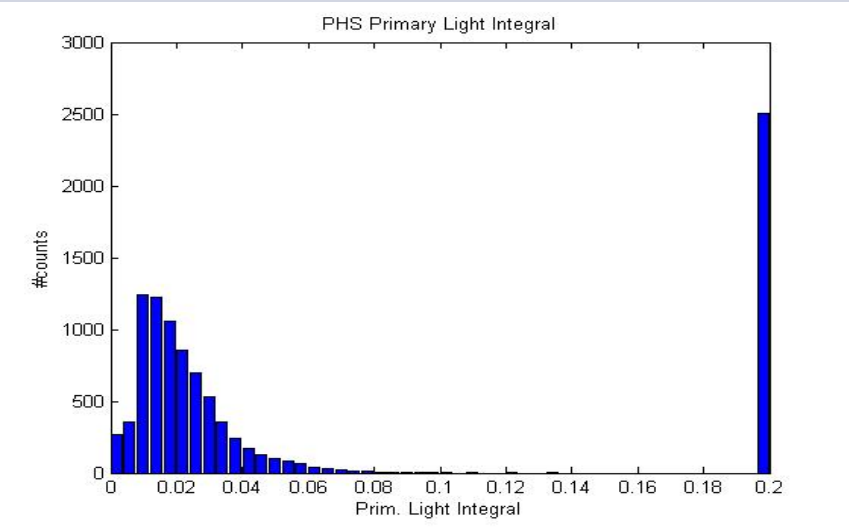
PMT 9113WB: V_{PM}(V) = -1100V
VD=-700V; VC=0; Va=+1750V
*Full energy peak (*764keV) @ch75



TOT (1mV) for Primary and secondary light pulses

PHS – Pulse Height Spectra



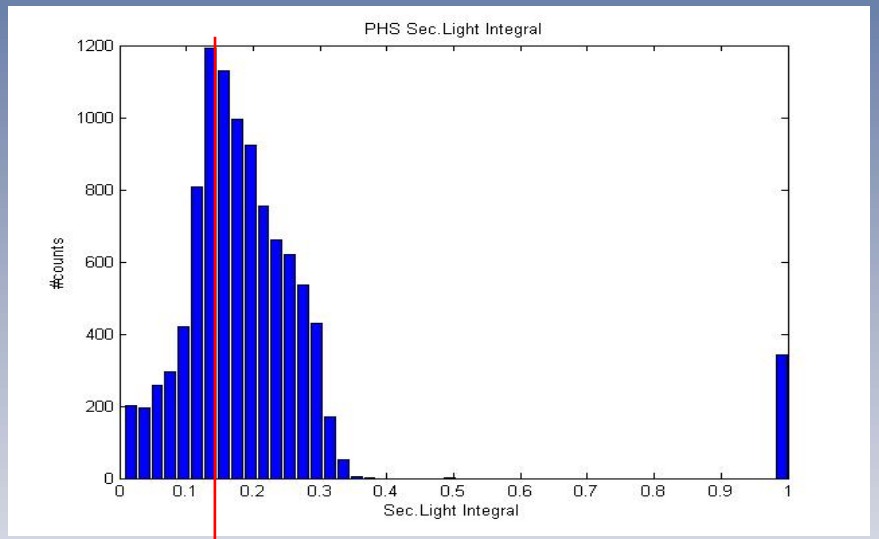


Preliminary Measurements with MSGC ILL 6C

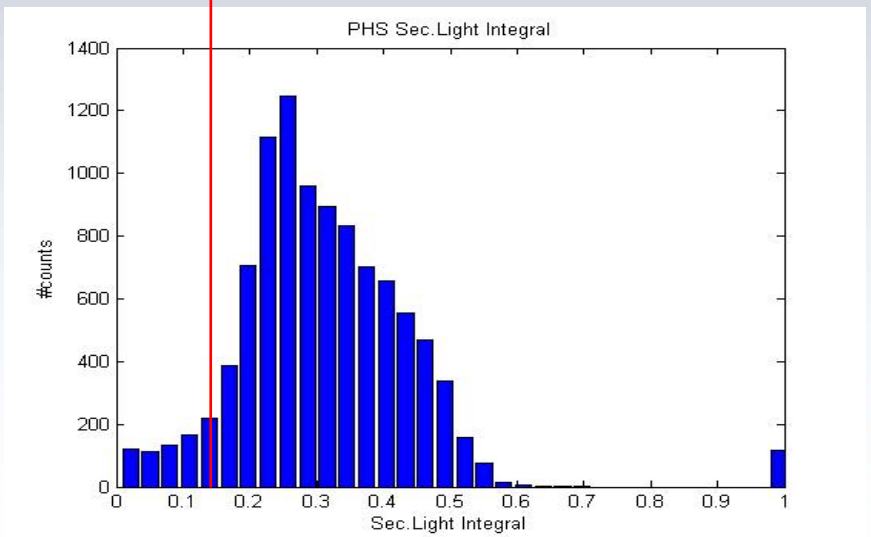
Signal Acquisition/ACQIRIS

PMT 9113WB: V_{PM}(V) = -1100V
*Full energy peak (*764keV)
@ ch75 ($Q_{sec.}$~46fC; Gain~13)

3 bar CF4
PHS – Secondary Light



5 bar CF4
PHS – Secondary Light

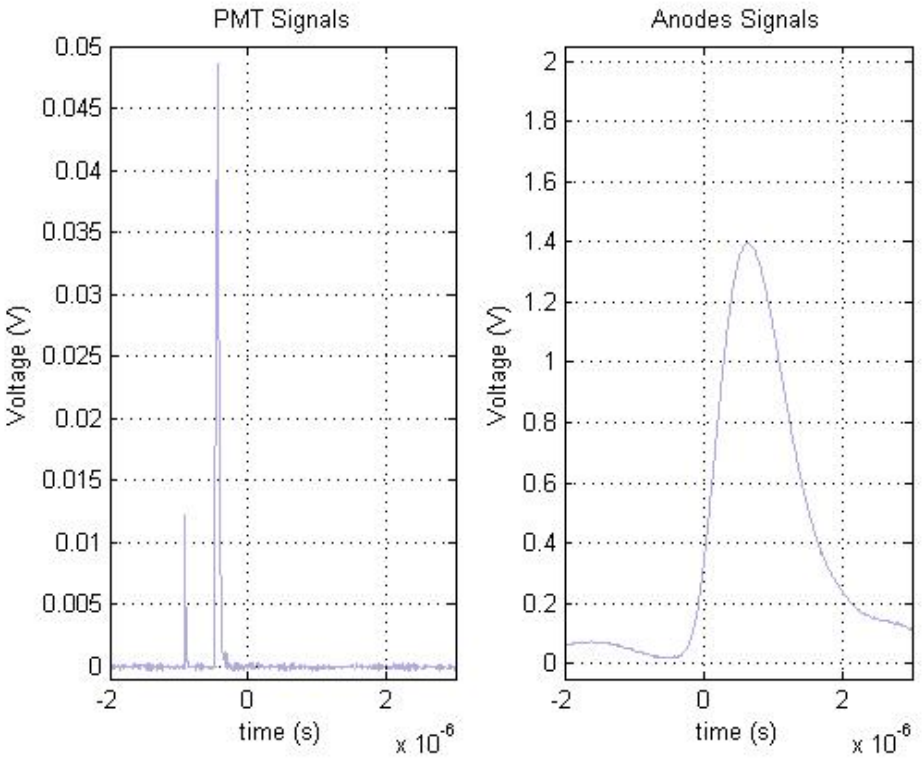


Preliminary Measurements with MSGC ILL 6C

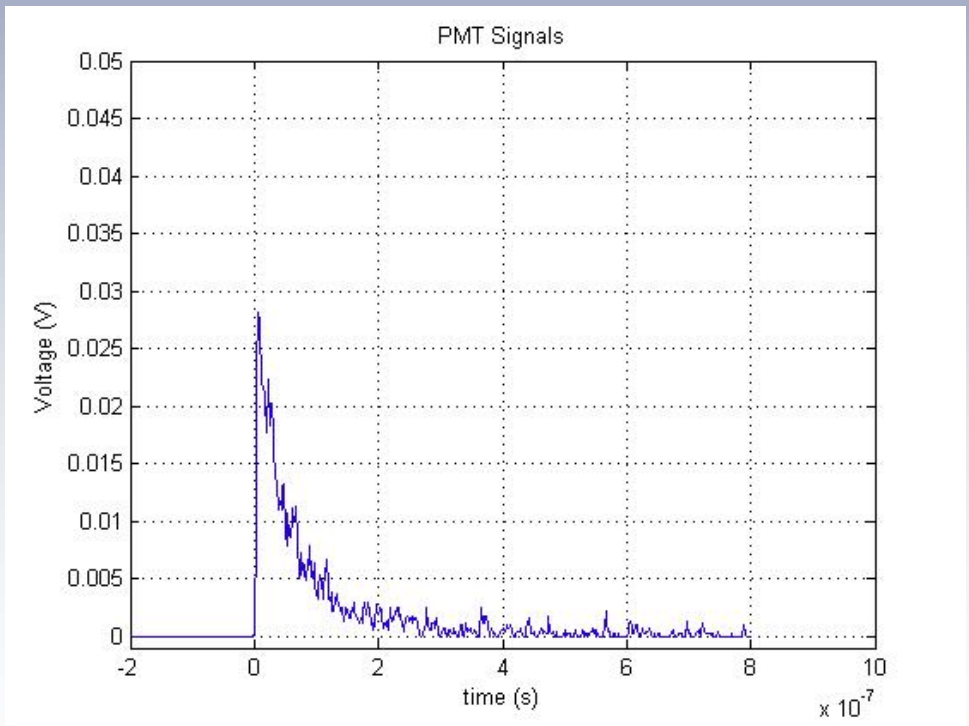
Signal Acquisition/ACQIRIS

PMT 9113WB: $V_{PM}(V) = -1100V$

^3He (2bar)+CF_4 (5bar)



GS20



Solid Scintillators

Material	Density of ^{6}Li atoms (cm^{-3})	Scintillation efficiency	λ max. emission (nm)	Light Yield (photons/neutron)	Decay (ns)
Li glass (Ce) (GS20)	$1.75x10^{22}$	0.45 %	395 nm	~7,000	75
LiI (Eu)	$1.83x10^{22}$	2.8 %	470	~51,000	1400
ZnS (Ag) - LiF	$1.18x10^{22}$	9.2 %	450	~160,000	>1000