

Summary of GlueX Detector Subsystems

18 May 2005 P. Smith

Detector	Photon tagger	Pair spectrometer	Upstream Photon veto	Start counter	Central drift	Forward drifts	DIRC	Time-of-flight	Barrel calorimeter	Forward calorimeter
Type	Scintillator	Si microstrip	Scintillator	Scintillator	Straw tube	Planar chamber	Quartz	Scintillator	Sci fibers	Lead glass
Channel count	140 fixed 120 movable	2048	112	40	3240	2900 anode 11,400 cathode	2000 TDC 32 FADC	168	2112	2500
Signal source	PMT fixed SiPMT movable	Silicon microstrip	PMT	PMT	Straw tube	anode wires cathode strips	Multi-anode PMT	PMT	SiPMT	PMT
Physics signal	100 pe	22000 e	100 pe	100 pe	25 e	94 e	25 pe	500 pe	250 pe/GeV	250 pe/GeV.
Energy resolution	0.1% (segmentation)	N/A	10%/√E	N/A	20%	N/A	N/A.	N/A	2% + 5%/√E	3.6% + 7.3%/√E
Time resolution	100 ps	25 ns	1 ns	350 ps	1 ns	1 ns	200 ps	80 ps	150 + 50/√E ps	400 ps
Gain in detector	10 ⁶	1	10 ⁶	10 ⁶	10 ⁴	5 x 10 ⁵	10 ⁶	10 ⁶	8 x 10 ⁵	8 x 10 ⁵
Preamp gain	no	10 ⁴	no	no	10 ³	44	10	no	no	no
Typical charge	16 pC	35 pC	16 pC	16 pC	40 pC	300 pC anodes 50 pC cathodes	4 pC	80 pC	32 pC/GeV	32 pC/GeV
Signal range	5	10	100	10	100	10 anodes 100 cathodes	10	10	160 pC max 1.6 pC min 0.16 pC lsb	160 pC max 1.6 pC min 0.16 pC lsb
Maximum single channel rate	5 MHz	1 MHz	1 MHz	10 MHz	600 KHz	140 KHz	250 KHz	6 MHz	1.4 MHz	2 MHz
Discrimination	constant fraction	no	no	constant fraction	no	yes (anode) no (cathode)	yes	constant fraction	yes	no
FADC	8 bits 250 Msps	8 - 12 bits 62.5 Msps	8 bits 250 Msps	8 bits 250 Msps	10 - 12 bits 125 Msps	Cathodes: 8 - 12 bits 62.5 Msps	8 bits 250 Msps	8 bits 250 Msps	8 bits 250 Msps 0.5 V fs	8 bits 250 Msps 0.5 V fs
TDC	62 ps	no	no	62 ps	no	Anodes: 125 ps	125 ps	62 ps	62 ps	no
Level 1 trigger	yes (low rate runs)	no	no	track count	no	no	no	track count	energy sum	energy sum