

Summary of GlueX Detector Subsystems

2 March 2005 P. Smith

Detector	Photon tagger	Pair polarimeter	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	150 fixed 100 movable	2048	24	40	3240	2900 anode 11,400 cathode	2000 TDC 32 FADC	168	960	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	25 e	25 pe	500 pe	100 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	200 ps	400 ps
Maximum single channel rate	5 MHz	1 MHz	1 MHz	10 MHz	1 MHz	1 MHz	250 KHz	1 MHz	10 KHz	1 MHz
Gain in detector	10 ⁶	1	10 ⁶	10 ⁵	10 ⁴	10 ⁴	10 ⁶	10 ⁶	10 ⁶	10 ⁶
Typical charge	16 pC	3.5 fC	16 pC	16 pC	40 fC	40 fC anodes 4 fC cathodes	4 pC	80 pC	16 pC/GeV	40 pC/GeV
Preamp gain	no	10 ⁴	no	no	10 ³	10 ³ anodes 10 ⁴ cathodes	10	no	no	no
Discrimination	constant fraction	no	no	constant fraction	no	yes (anode) no (cathode)	constant fraction	constant fraction	constant fraction	no
Dynamic range	5	10	100	100	1000	100 anodes 1000 cathodes	10	10	500	500
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	8 bits 250 Msps
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	track count energy sum	energy sum