

# Summary of GlueX Detector Subsystems

18 May 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
<b>Type</b>	Scintillator	Si microstrip	Scintillator	Scintillator	Straw tube	Planar chamber	Quartz	Scintillator	Sci fibers	Lead glass
<b>Channel count</b>	140 fixed 120 movable	2048	112	40	3240	2900 anode 11,400 cathode	2000 TDC 32 FADC	168	3072	2500
<b>Signal source</b>	PMT fixed SiPMT movable	Silicon microstrip	PMT	PMT	Straw tube	anode wires cathode strips	Multi-anode PMT	PMT	SiPMT	PMT
<b>Physics signal</b>	100 pe	22000 e	100 pe	100 pe	25 e	25 e	25 pe	500 pe	100 pe/GeV	250 pe/GeV.
<b>Energy resolution</b>	0.1% (segmentation)	N/A	10%/√E	N/A	20%	N/A	N/A.	N/A	2% + 5%/√E	3.6% + 7.3%/√E
<b>Time resolution</b>	100 ps	25 ns	1 ns	350 ps	1 ns	1 ns	200 ps	80 ps	150 + 50/√E ps	400 ps
<b>Gain in detector</b>	10 <sup>6</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>	10 <sup>4</sup>	10 <sup>4</sup>	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>
<b>Typical charge</b>	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
<b>Preamp gain</b>	no	10 <sup>4</sup>	no	no	10 <sup>3</sup>	10 <sup>3</sup> anodes 10 <sup>4</sup> cathodes	10	no	no	no
<b>Dynamic range</b>	5	10	100	100	1000	100 anodes 1000 cathodes	10	10	500	200 fC → 100 pC
<b>Maximum single channel rate</b>	5 MHz	1 MHz	1 MHz	10 MHz	600 KHz	140 KHz	250 KHz	6 MHz	1.4 MHz	2 MHz
<b>Discrimination</b>	constant fraction	no	constant fraction	constant fraction	no	yes (anode) no (cathode)	constant fraction	constant fraction	constant fraction	no
<b>FADC</b>	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
<b>TDC</b>	62 ps	no	62 ps	62 ps	no	Anodes: 125 ps	125 ps	62 ps	62 ps	no
<b>Level 1 trigger</b>	yes (low rate runs)	no	no	track count	no	no	no	track count	energy sum	energy sum