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The silicon photomultipliers in the detector subsystems of the GlueX experiment

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The subsystem detectors of the GlueX experiment uses the silicon photomultiplier (SiPM) photodetectors. The detectors operate in condition of 2MHz load level and up to 104 pixels «fired» with ˜0.3ns time resolution. The list of such detecors : the scintillating mycroscope to determine the energy of a beam photon by detecting the bremsstrahlung electron after radiation; the magnet spectrometer of the electron positron pair to measure the spectra of linearly polarized photons; the start counter which surround the liquid hydrogen target and whose main goal is to identify the beam bucket associated with the interaction; the electromagnetic barrel calorimeter to measure the energy and the direction of secondary photons comes from the target. Around five thousand SiPM‘s in total uses in the detectors of experiment. We present the results of the time resolution measurements and the relaxation time measurements for two SiPM types in the experimental conditions. The first is the SiPM with matrix specially developed for the experiment and the second is the SiPM with different size of pixels.

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