# Shaping Time and Module Length for the ZEUS Silicon Vertex Detector

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For the planned ZEUS silicon vertex detector, the maximum allowable length of a readout strip is of interest. Here we assume that one will assemble a module by bonding together several detectors of about 6cm length and read it out with channel of the fronend chip. The length will be limited by the noise, which will increase with the readout length. We have measured the noise of modules made of 6cm, 12cm and 18cm with a front electronics of 22ns shaping time, and predict that with 50ns shaping time, which is well matched to the HERA time structure, modules of 18cm can be used with a signal/noise of about 15.
The data is shown in Fig.1, where the noise for a 22ns shaping time is shown as a function of module length, The signal is about 4fC, which means that for the fast shaping time, the signal/noise is about 13 for 12cm long modules and about 10 for 18cm long modules. While the signal-to-noise is acceptable for 12cm long detectors, it is marginal.for 18cm.
On the other hand, we can predict the performance for longer shaping time by scaling the noise with the square root of the shaping time, which reults in the second curve in Fig 1 for a shaping time of 50ns. We find that with 50ns shaping time, even 18cm long strips afford a signal/noise of 15. We recommend to plan for 50ns shaping time for the ZEUS silicon vertex detector frontend, to allow maximum flexibility in the choice of module length.

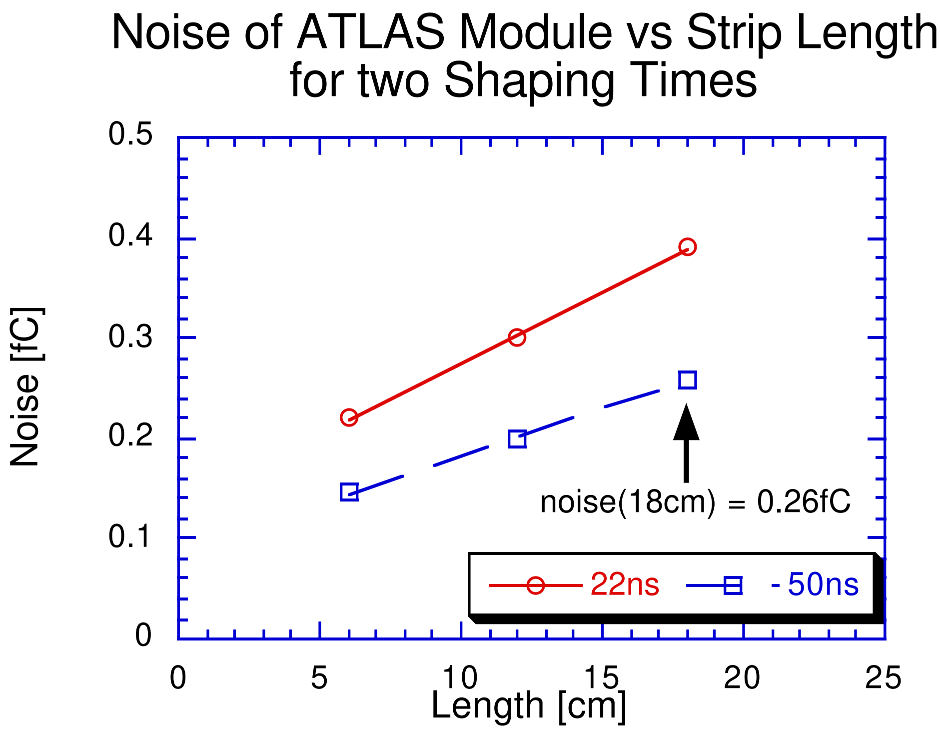


Fig.1 Noise of a bipolar frontend as a function of strip length for shaping times of 22ns(measured) and 50ns(projected).