

A GOL Based Optical Demo Link to Study System Issues for the ATLAS Inner Detector Readout Upgrade

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The GOL ASIC is a serializer chip developed by CERN based a 0.25 μm CMOS technology. The GOL operates with two data rate: 800 Mbps and 1.6 Gbps. This ASIC has been evaluated for the ATLAS Inner Detector readout upgrades for the SLHC. A demo link is being designed to read out test staves through fiber optics and study system issues in a giga-bit optical link. The results of the radiation evaluation and the demo-link will be reported.

Summary

The GOL ASIC has been qualified and are used for detector readout systems in LHC experiments. We irradiated this ASIC with a 230 MeV proton beam for the ATLAS Inner Detector readout upgrade for the SLHC. TID effects were studied and SEE from the GOL was measured. Performance of the GOL before and after the irradiation tests was also compared. This is a part of an ATLAS R&D project for the SLHC. Based on the test results, we conclude that the GOL ASIC is suitable for the ATLAS Inner Detector readout upgrade for the SLHC.

Supported by US-ATLAS upgrade program, we are designing and constructing a GOL based optical demo link to read out the test stave through optical fiber. We intend to use this demo link to study optical link system level issues like the jitter in the link system, overall system reliability and the channel redundancy implementation, PCB area requirement and system power consumption, etc. In this demo link design, the GOL interface to the fiber is chosen to be the Versatile Link. A study about this interface is also needed. We will report the status and the latest test results with this demo link.

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