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Trigger Data Serializer ASIC chip for the ATLAS New Small Wheel sTGC Detector XIANGTING MENG, University of Michigan and Lanzhou University, JINHONG WANG, LIANG GUAN, ZIRU SANG, JOHN CHAPMAN, BING ZHOU, JUNJIE ZHU, University of Michigan — The small-strip thin-gap chambers (sTGC) will be used as the trigger device for the Phase-I upgrade of the ATLAS new small wheel (nSW) muon detector. An Application-Specific Integrated Circuit (ASIC) chip is needed to collect digital signals from both pad and strip detectors and serialize the outputs to the circuitry located on the rim of the nSW. The large number of input channels (128 differential input channels), short time available to prepare and transmit trigger data (¡100 ns), high speed output data rate (4.8 Gbps), harsh radiation environment (about 300 kRad), and low power consumption (¡1 W) impose great challenges for the design of this ASIC chip using the IBM 130 nm CMOS process. We will present our design and test results based on the prototype chip we build.

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