Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Electronics quality assurance of components of the Upstream Tracker Detector for the LHCb Upgrade I XIXIN LIANG, Syracuse University high energy group, SYRACUSE UNIVERSITY HIGH ENERGY GROUP TEAM — The LHCb experiments is in the commissioning phase of an ambitious upgrade project that will allow a much upgraded sensitivity to interesting decays with a combination of higher luminosity and the deployment of a purely software trigger. A key element of the software trigger is a fast tracking based on the vertex detector and a tracking system located in front of the LHCb magnet, the Upstream Tracker (UT). It is a silicon micro-strip detector with a novel front end ASIC that allows fast readout. A key goal is a high hit efficiency to be sure that the forward-tracking algorithm in the trigger will achieve the desired performance. To reach this goal, all components have to undergo a rigorous quality assurance process. There are four major testing steps: silicon sensor current versus voltage characterization, front end electronics (SALT) at different stages of the mechanics integration: on the hybrid panels, the assembled silicon-hybrid modules and in the final stage of the production, when 14 modules are mounted on the structures providing mechanical support and cooling (staves). Each step encompasses more than thousands of tests, including assessment of intrinsic and common mode electronics noise, gain measured with a test pulse calibration. The complete system comprises more than 1000 Si sensors and 500,000 signal channels. In order to finish this large task in a reliable and efficient manner, two electronic testing systems were set up in the high-energy physics laboratory at Syracuse University to select only components satisfying our performance criteria.

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Date submitted: 05 Dec 2020 Electronic form version 1.4