Test and extraction methods for the QC parameters of silicon strip sensors for ATLAS upgrade tracker

- ATLAS Inner Tracker (ITk) fully silicon upgrade includes 22000 strips sensors that all need to be evaluated for quality control (QC) at various institutes with different setups

- For this, a QC framework has been developed to take data files produced with QC tests and use algorithms to extract parameters, evaluate specification compliance, upload to a common database, and do batch reporting

- In particular, algorithms were developed to aid with the most common tests: IV, CV, individual strips, current stability, and metrology.

- For IV tests, several algorithms for determining breakdown voltage were explored and evaluated for robustness and accuracy

- For individual strip tests, particular work has gone into identifying the type of fault from various combinations of measurements of the AC metal current and the RC network

- Reporting summarizes all QC tests for a batch concisely for QC approval, which is done batch-by-batch

- Reporting gives interactive diagnostic histograms and plots by batch to allow technicians to qualitatively detect outliers or batch issues not immediately obvious to algorithms.

- Scripts have successfully processed 2500 preproduction and production sensors in 7 institutes and we are about to begin production.