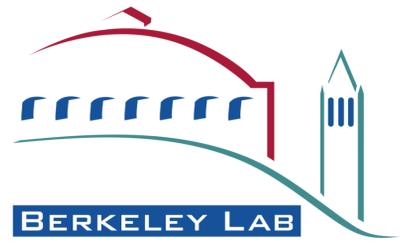




Sensor Module Studies



Ecole d'ingénieurs et d'architectes de Fribourg
Hochschule für Technik und Architektur Freiburg



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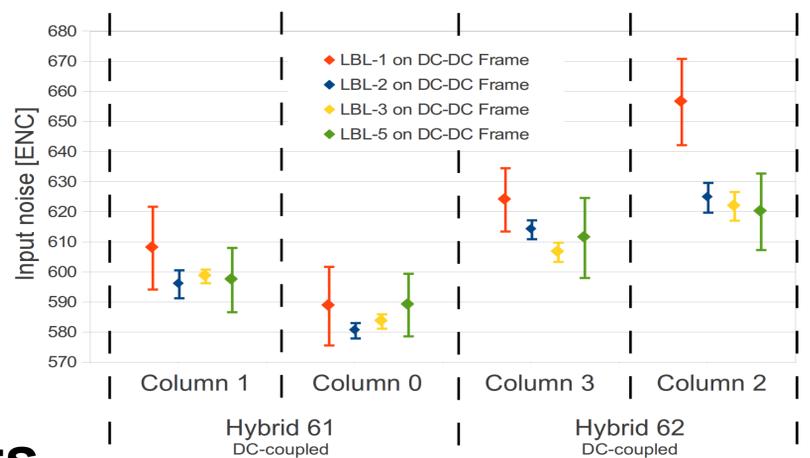
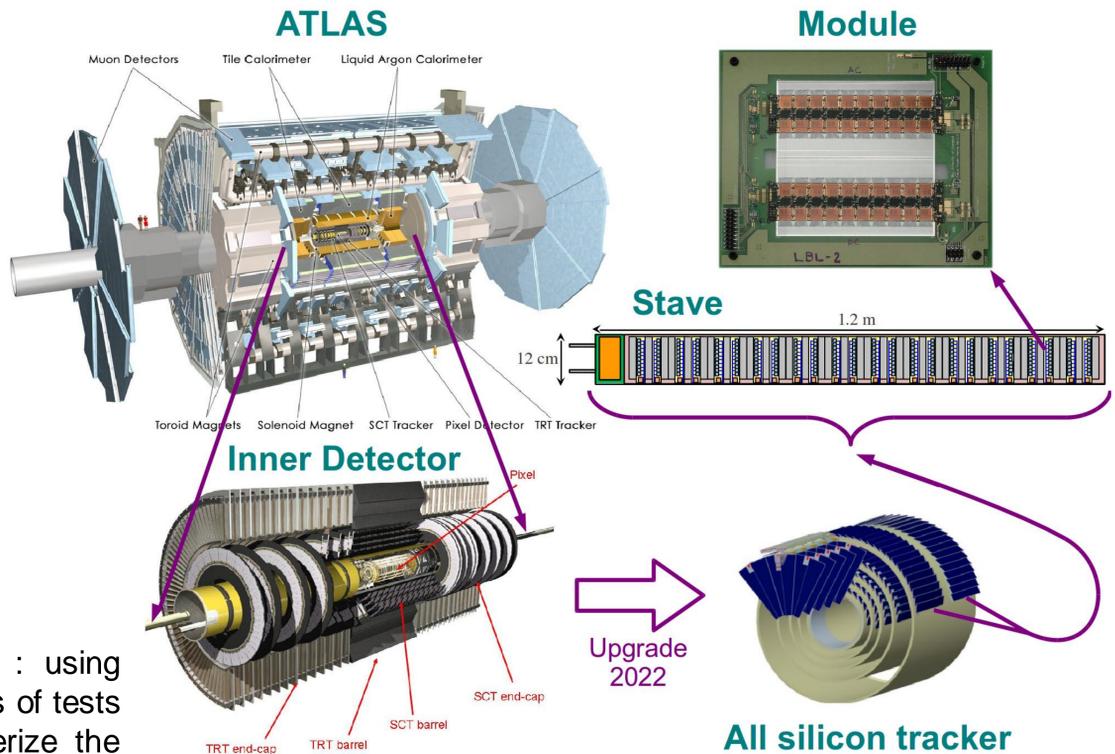
ELECTRICAL ENGINEERING

Goals

This thesis was about the studies of silicon sensors arrays for the ATLAS detector upgrade. The main goal of this work was to assemble and test the US Stavelet, a Stave prototype. This project was decomposed into three parts : the Stavelet assembly, the test systems and the electrical measurements.

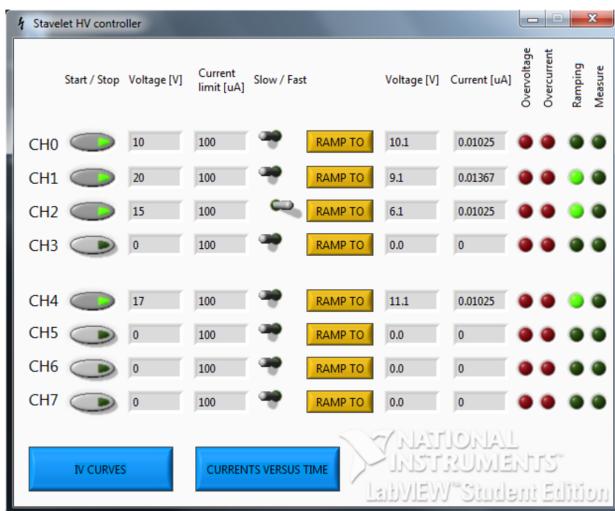
Specifications

- Survey and study of past work.
- Characterization of sensor Modules : using existing FPGA and host code, a series of tests were performed in order to characterize the performance of these multi-chip components.
- Development of a LabVIEW application to individually control silicon sensors powering.
- Inspection and test of Stavelet Core : a number of mechanical and metrological tests were performed.
- Mounting of sensor Modules on Core.
- Measurements of noise on arrays of sensor Modules.
- Final analysis and comparisons of results.



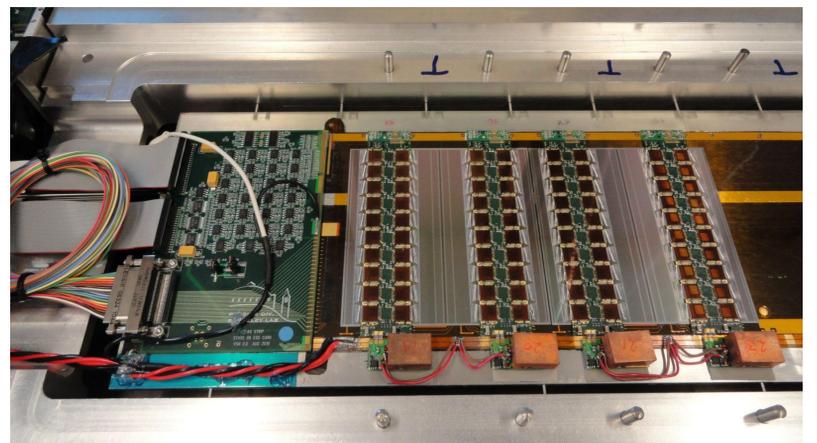
Results

- The Stavelet HV controller LabVIEW program was developed and used for Stavelet testing and silicon sensor characterization.
- A new test setup was installed in order to test the Stavelet.
- This test setup was characterized with respect to the noise influence of each of its individual components.
- Stavelet mechanical mounting tools were developed and used.
- Two out of the four Modules were mounted on the Stavelet.
- One of the Modules was damaged during the process.
- All of them were before characterized with respect to noise.
- The Stavelet was tested with one working Module.



Conclusion

This Stavelet will provide the LBNL with an up-to-date Stave prototype, allowing the LBNL ATLAS collaboration to test their embedded bus tape and compare the results with the baseline Stavelet prototypes. It will allow them to study the noise influence between Modules. New shielding and grounding configurations may show interesting results. Another long-term goal is to keep the know-how and to prepare the mass production.



Applicant:

Michaël Defferrard

Professors:

Marco Mazza,
Ottar Johnsen

Project proposed by:

Lawrence Berkeley
National Laboratory

University of California,
Berkeley

