

Brandeis: Stave Assembly Status

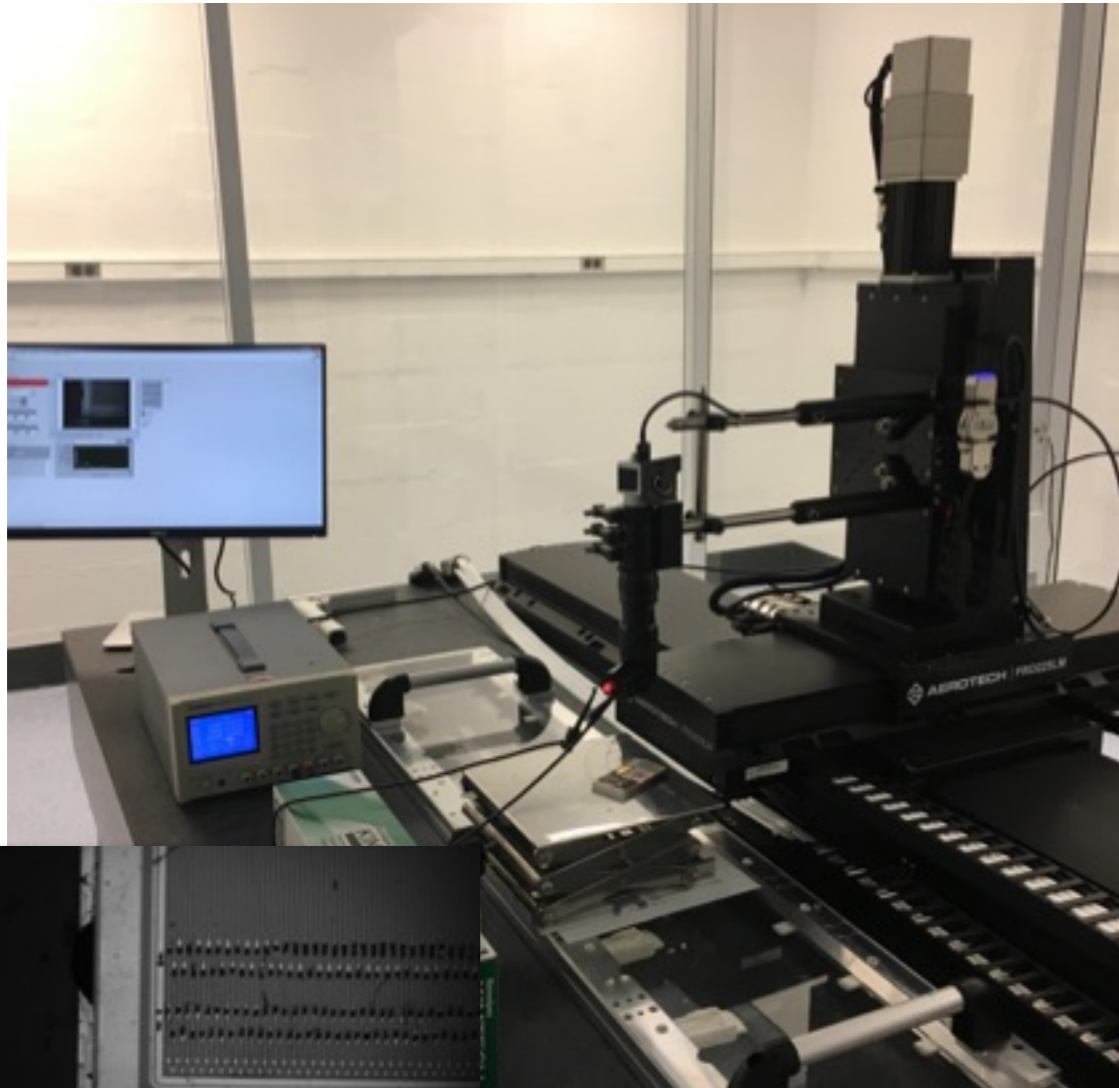
Laura Bergsten, Brendon Bullard, Hannah Herde, Gabriella Sciolla
Strip Module Meeting • 23 January 2017



Brandeis Stave Assembly Team

- Professor Gabriella Sciolla
- Graduate students: Laura Bergsten, Hannah Herde
- Undergraduate student: Brendon Bullard

Fall 2016



- October/November
 - XYZ stage and camera mounted in clean room at BNL (Gerrit and Russ)
- December
 - First survey codes developed in LabVIEW, inspired by RAL codes and geared specifically for BNL system
 - Early-stage surveys of TM stave core



January 2017: Prepare for TM Stave Assembly

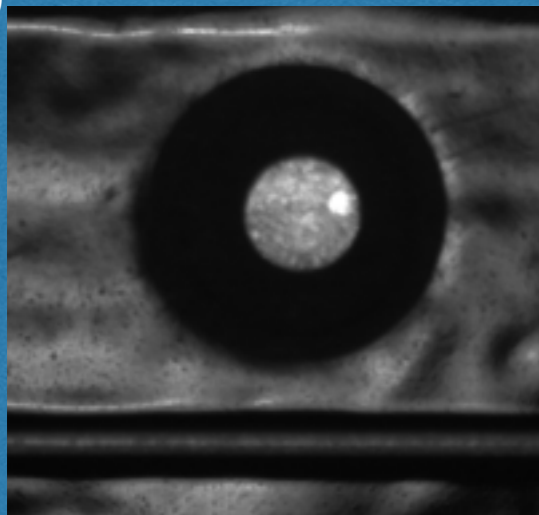
Objective: Generate assembly workflow in LabVIEW for constructing and surveying TM stave

🔍 Mining December data for development and testing

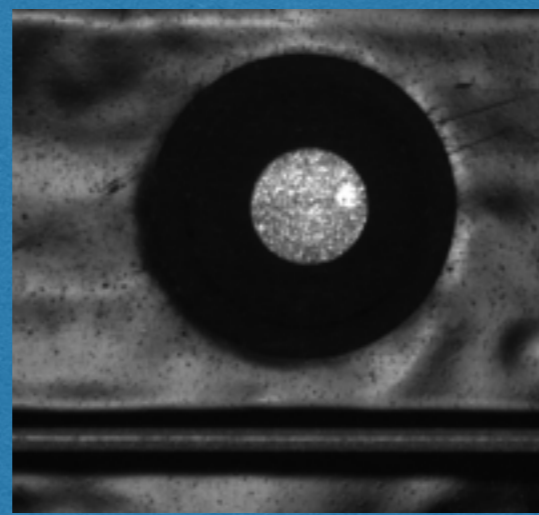
1) Automatically optimize camera focus; establish pixel-to-micron conversion [Gabriella & Hannah]

2) Define stave coordinate system, using tooling pins in locking points. Jens uses same approach at RAL. [Laura]

(1)

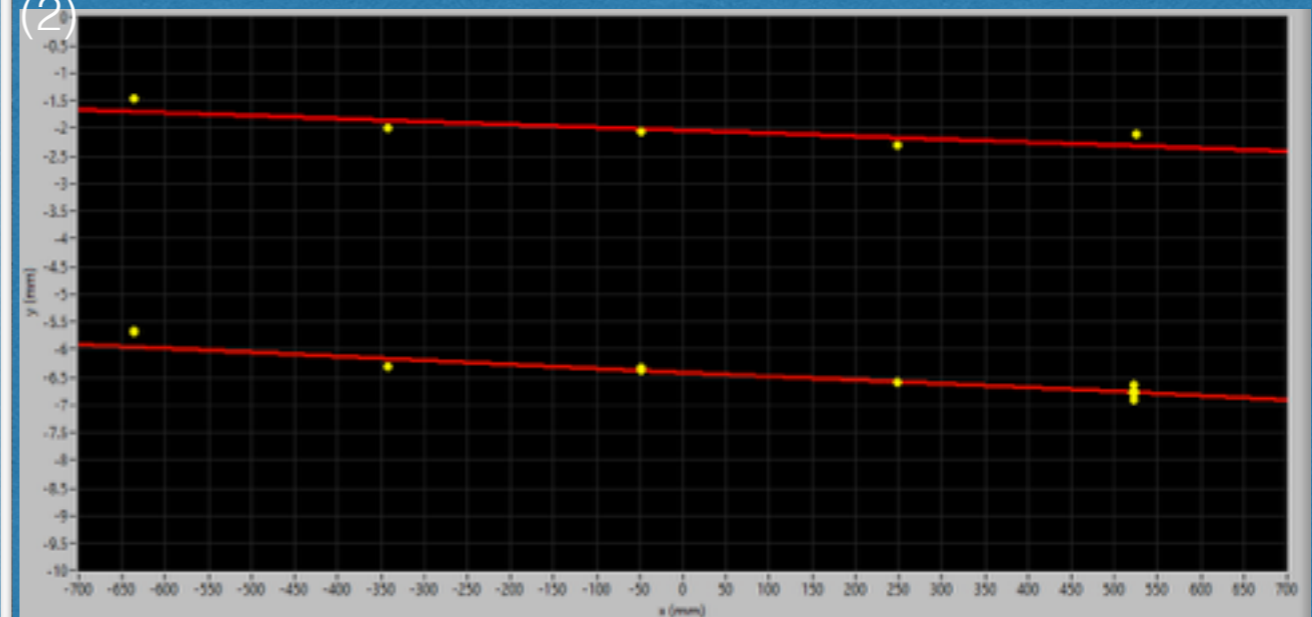


Δz , stage = $1000 \pm 3 \mu\text{m}$
edge length = 8.61 ± 0.30
radius = 141.62 ± 0.25



Δz , stage = $3200 \pm 3 \mu\text{m}$
edge length = 2.49 ± 0.12
radius = 144.50 ± 0.11

(2)



$m_{\text{top}} = -7.1 \times 10^{-4}$
 $m_{\text{bottom}} = -5.3 \times 10^{-4}$ — add errors

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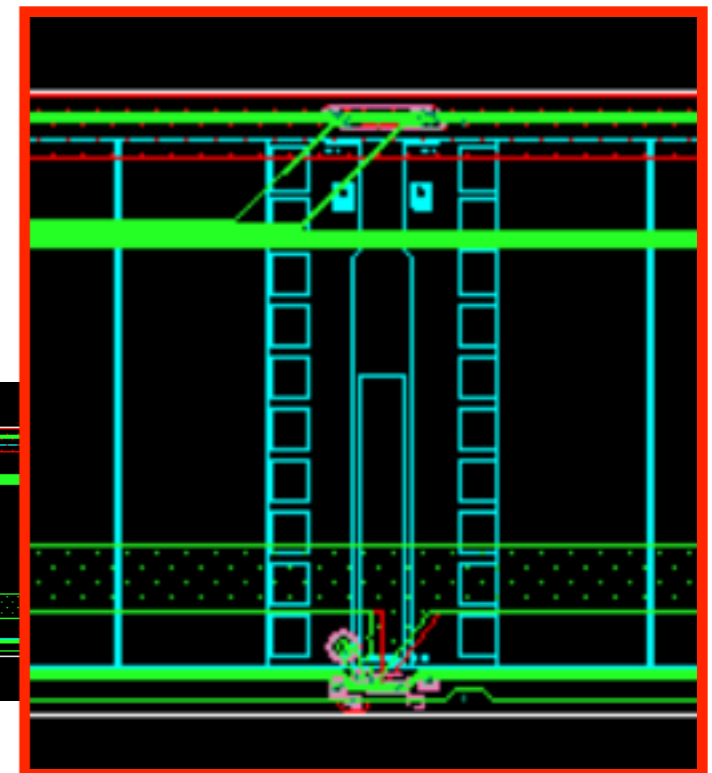
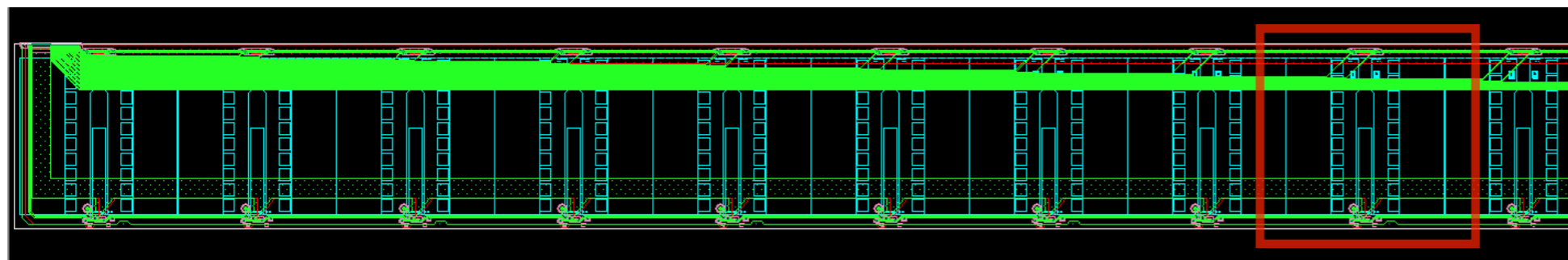
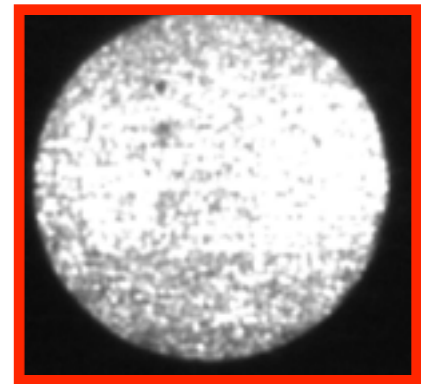
3) Survey stave before mounting modules

a) Precision of position of stave fiducial measurements
[Hannah]

b) Stave height profile [Hannah]

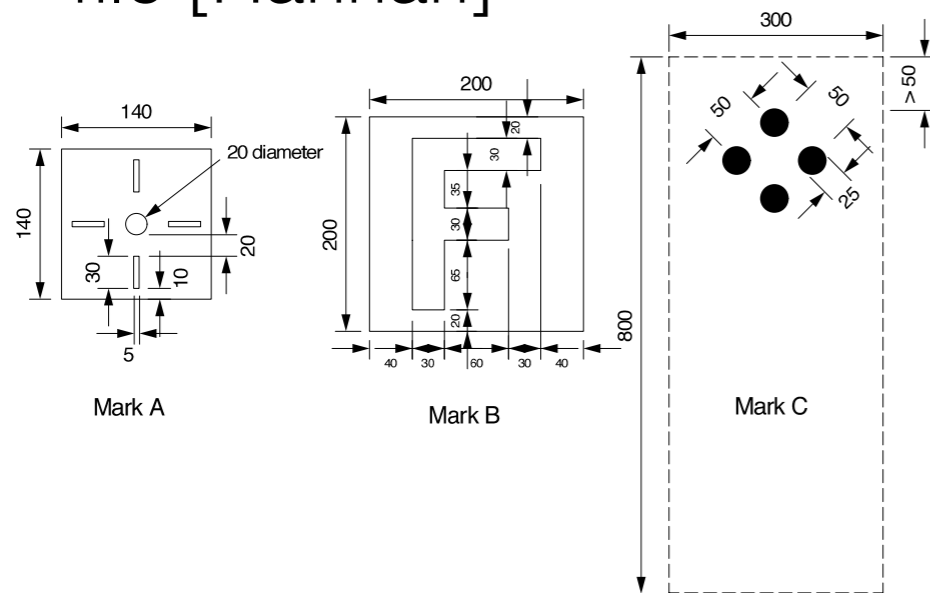
c) Calibrate Laura's coordinate system by comparing
parallelism of bus tape and locking points [Brendon]

d) Pitch analysis of TM core to quantify bus tape
uniformity [Brendon]



January 2017: Prepare for TM Stave Assembly

- 4) Monitor module fiducial positions continuously during mounting [Hannah]
- 5) Final survey of completed stave, recording modules positions to a file [Hannah]



Mark A and B are "metal" in the square opening.

Mark B is vendor's option (if no trouble, please add this).

Mark C and D are EITHER "opening" in the metal OR "metal" in the opening where the "background-free" area must be as wide as $300 \mu\text{m} \times 800 \mu\text{m}$ (approximately) and the C and D mark is placed asymmetrically in the "background-free" area with the wider open area being towards the centre of the detector.

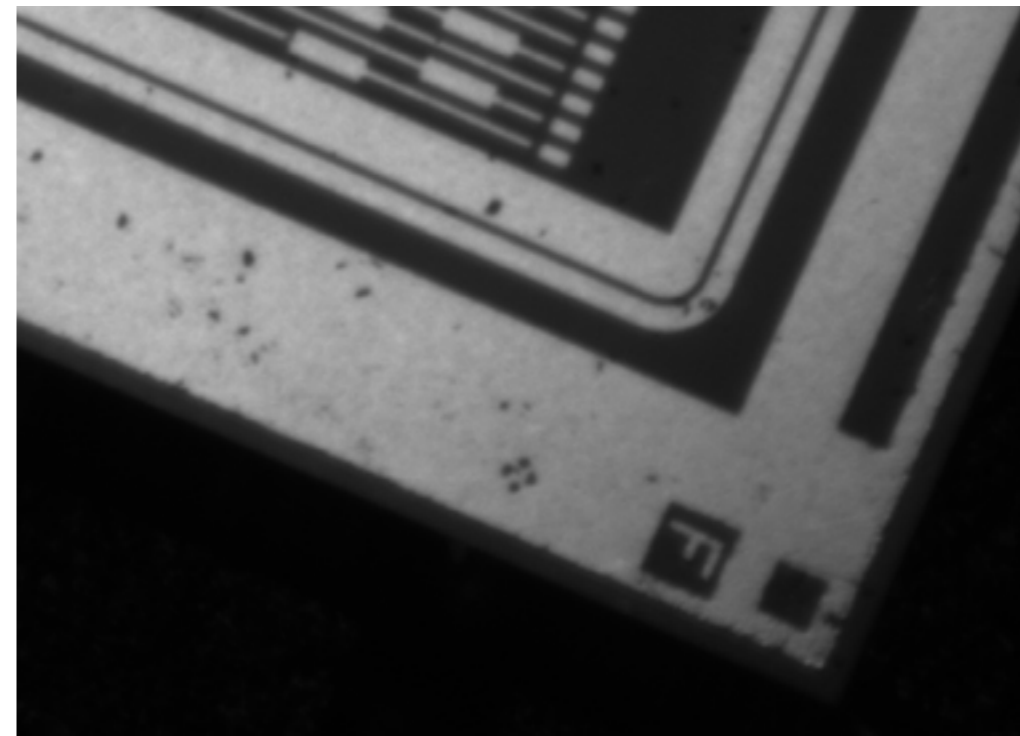


Fig. 5 Fiducial marks

From ATLAS07 Sensor Technical Specifications

Summary

- Good position for TM stave construction
 - Refining autofocus and coordinate system
 - Stave survey to be automated
 - Module monitoring possible; improvements underway; ~30% complete → on time for TM stave timeline

Back up

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