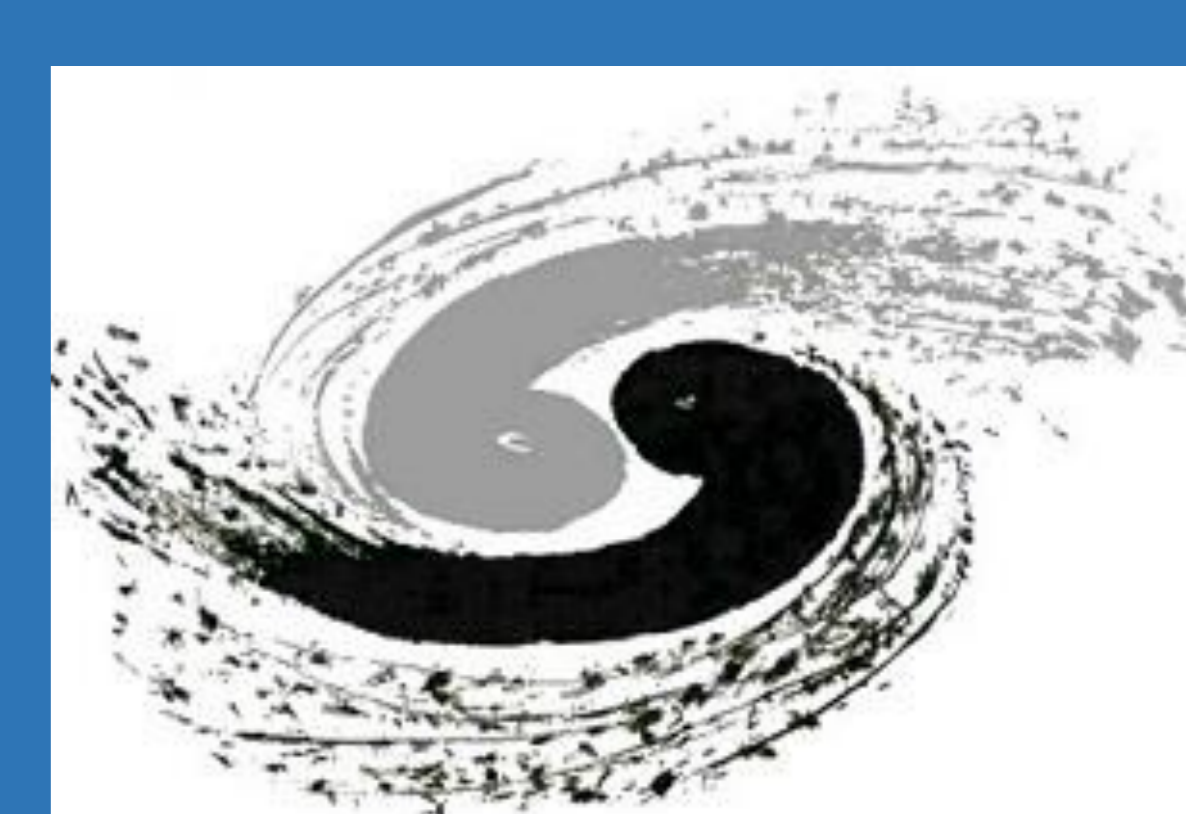
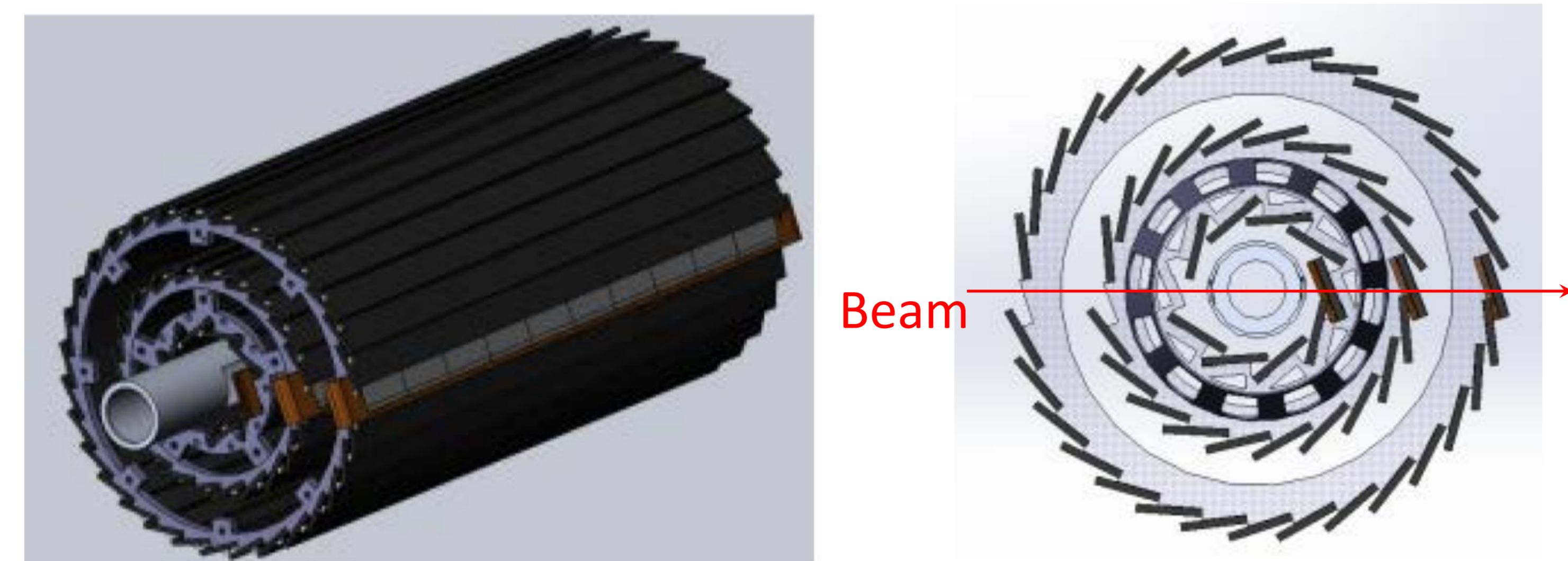


CPEC MOST2 vertex detector module assembly with Gantry system

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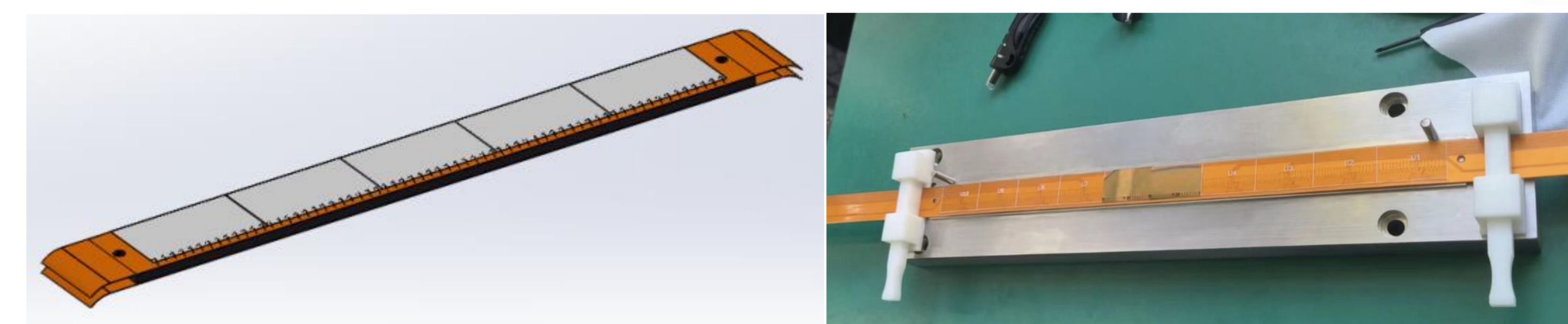


Introduction

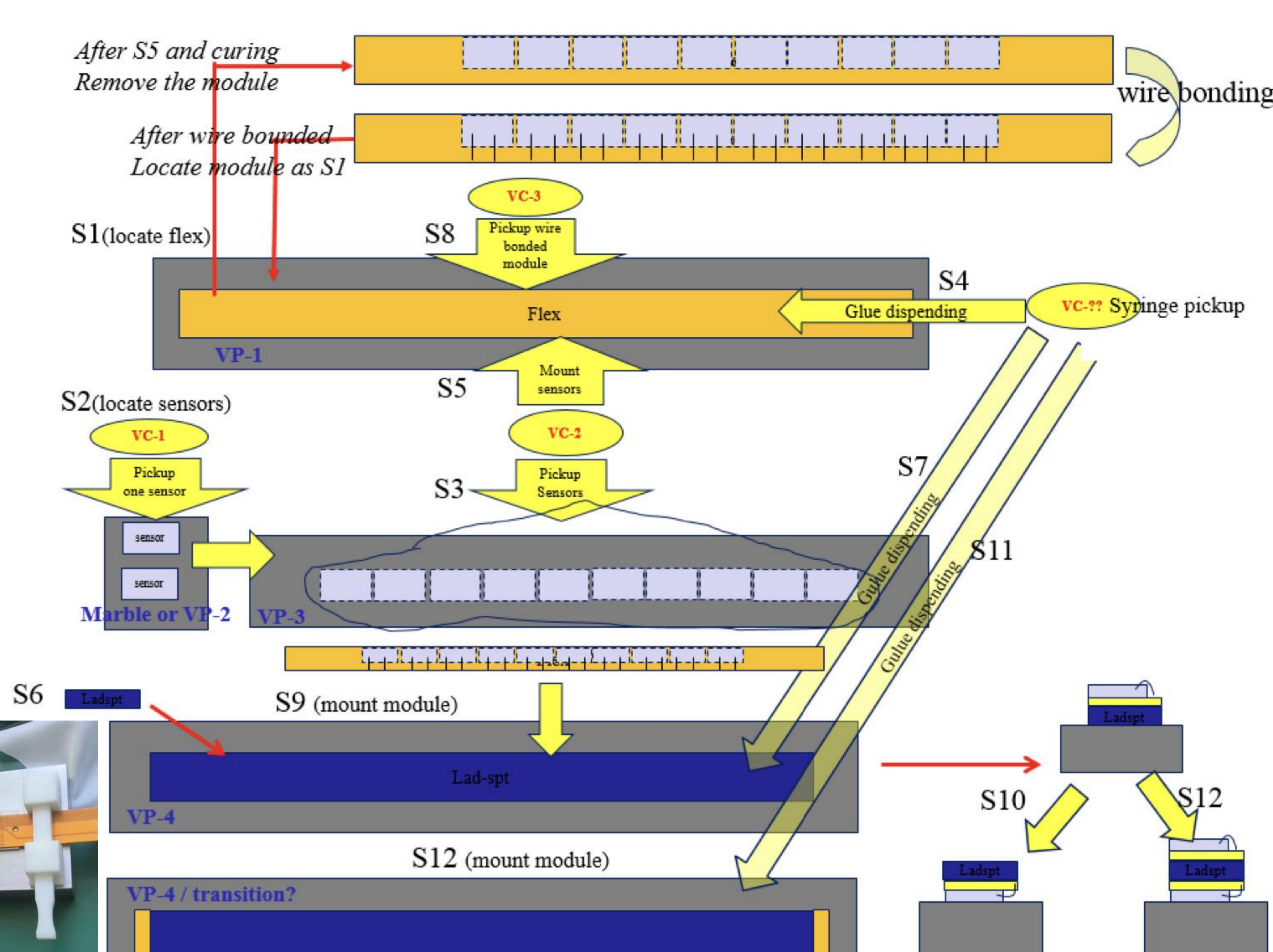


Assemble the MOST2 sensor and flex for prototype

- Long flex cable (>20cm)
- Very thin sensor (0.15mm)
- High alignment (1 flex with 10 sensors)
- Large amount (60 sensors in total)

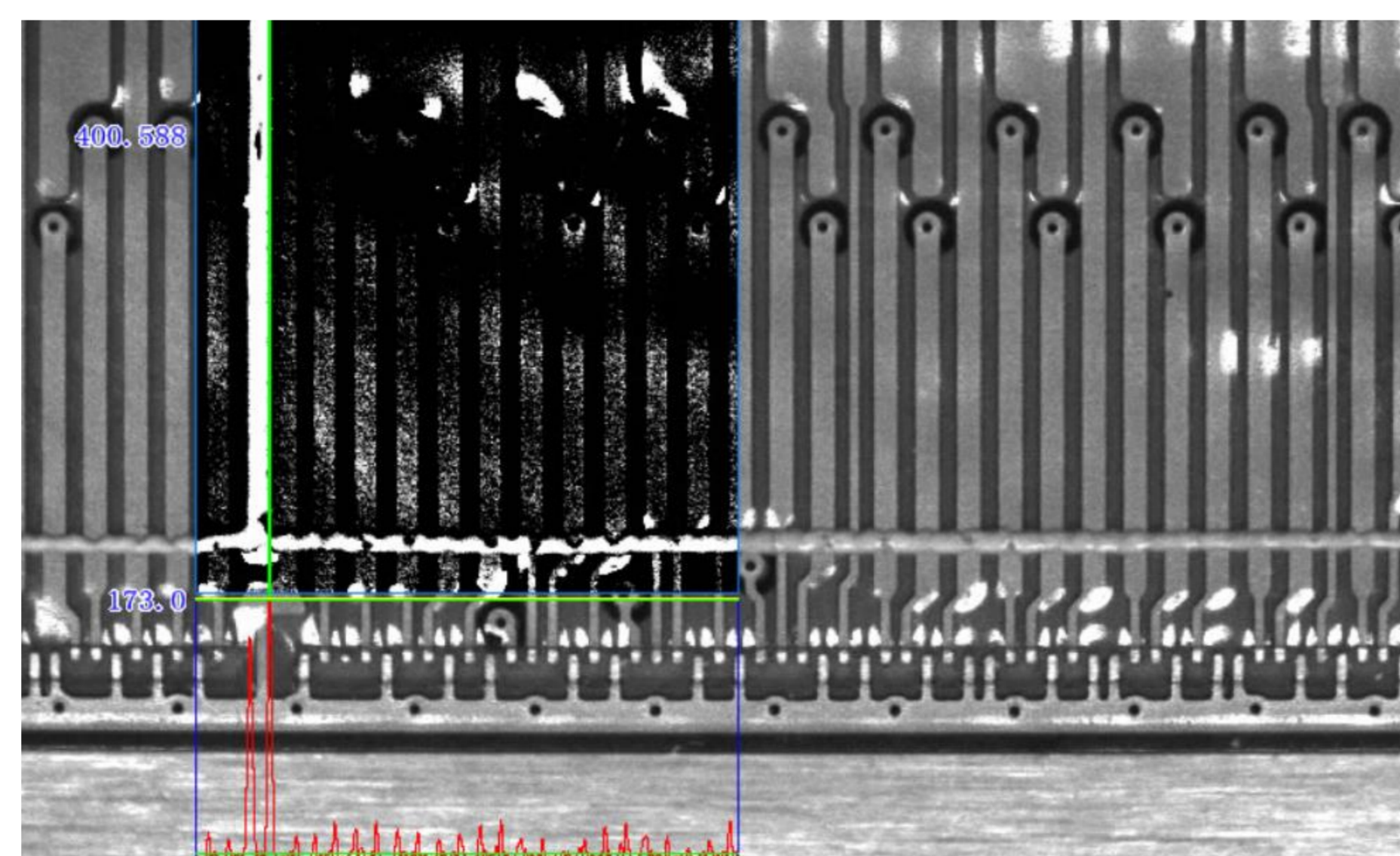
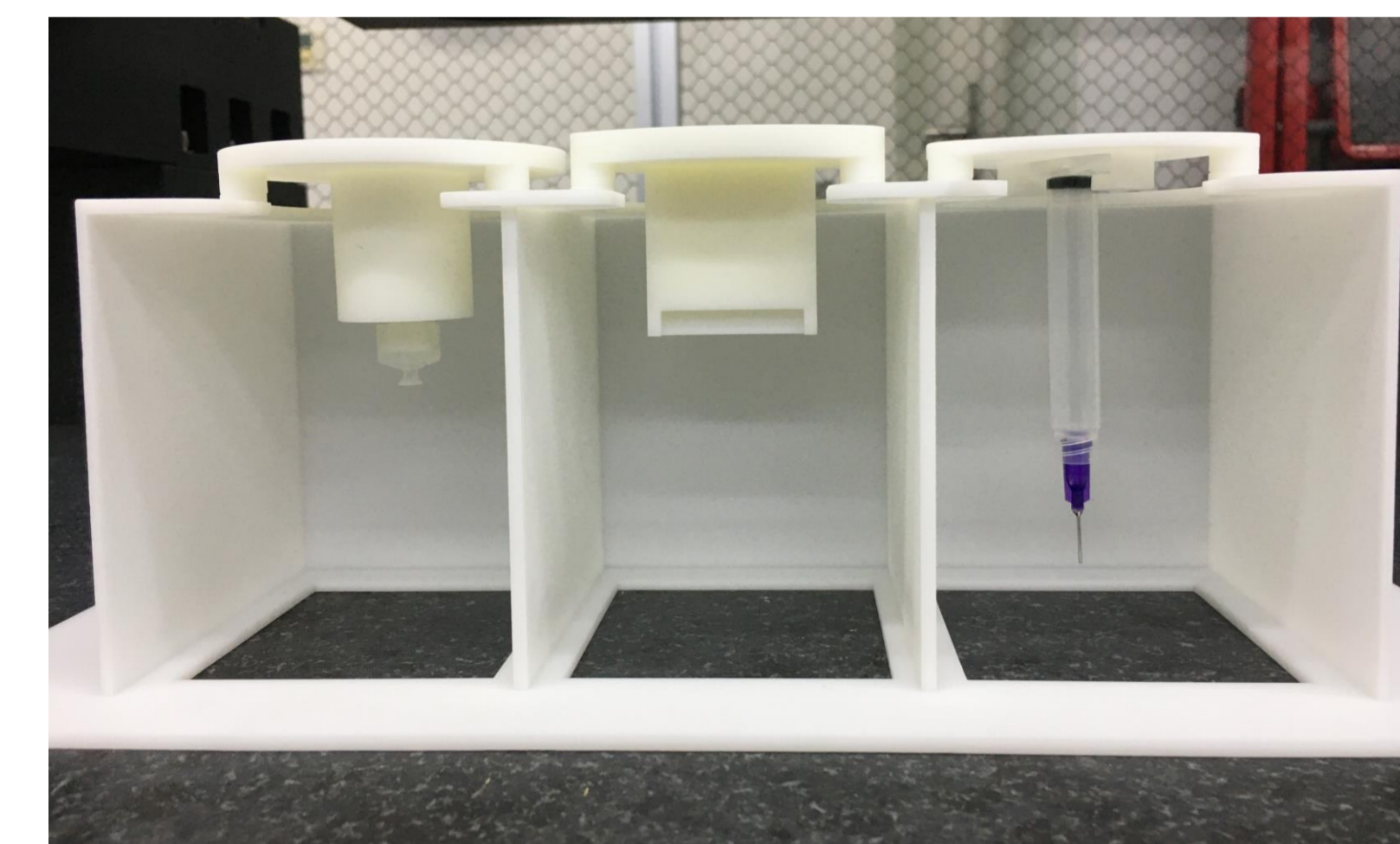
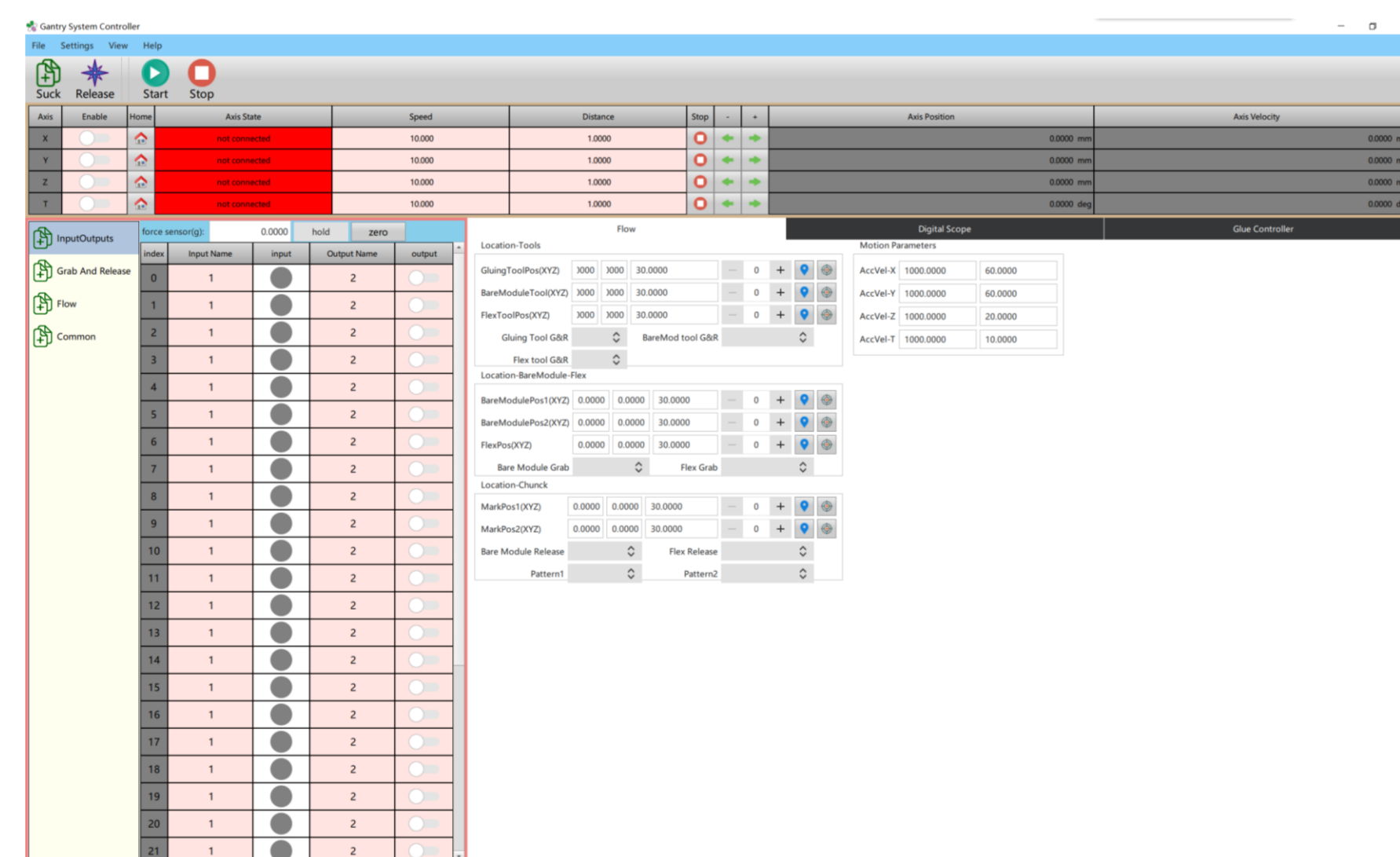
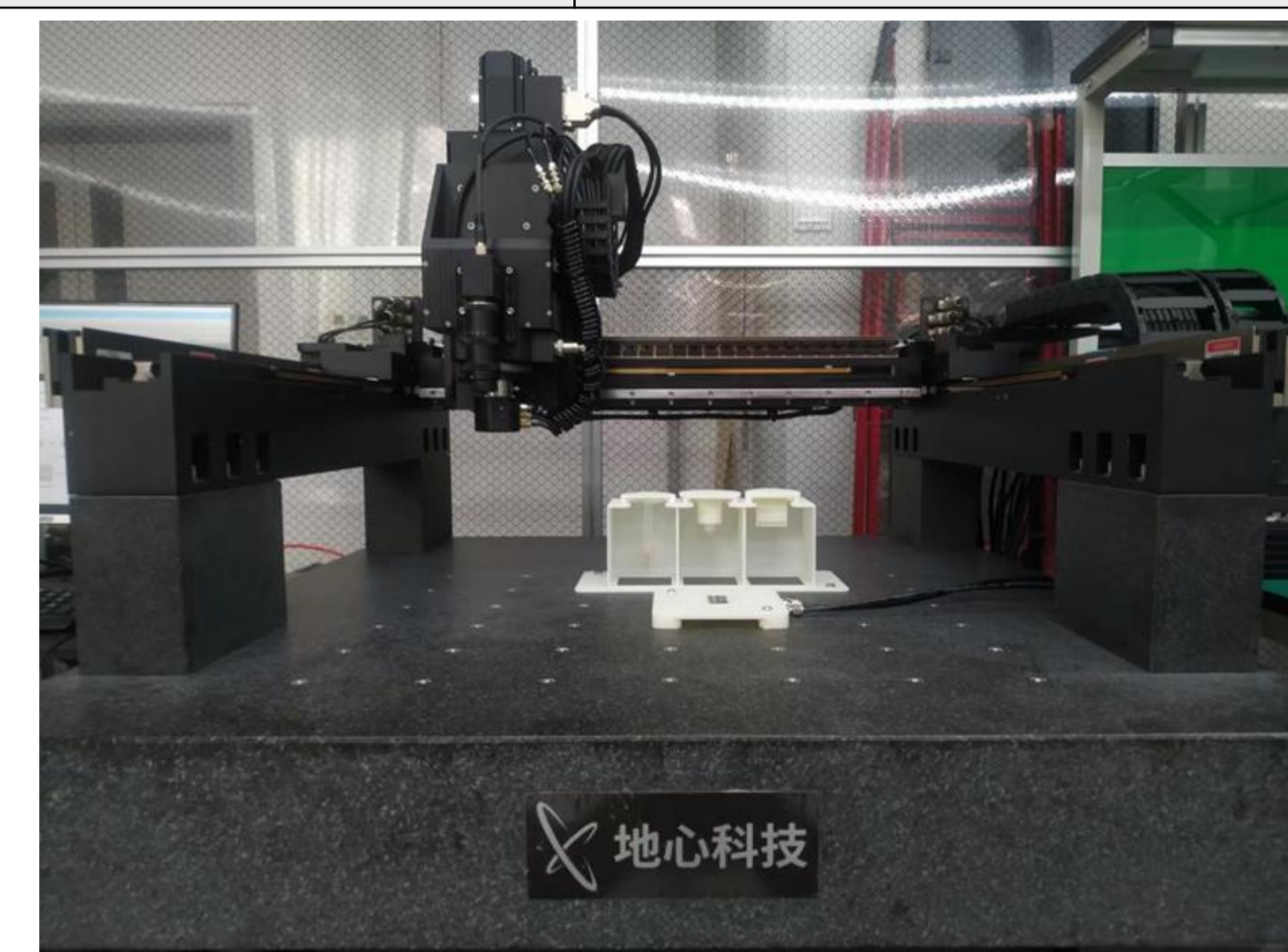


Automatic assembly procedures Design



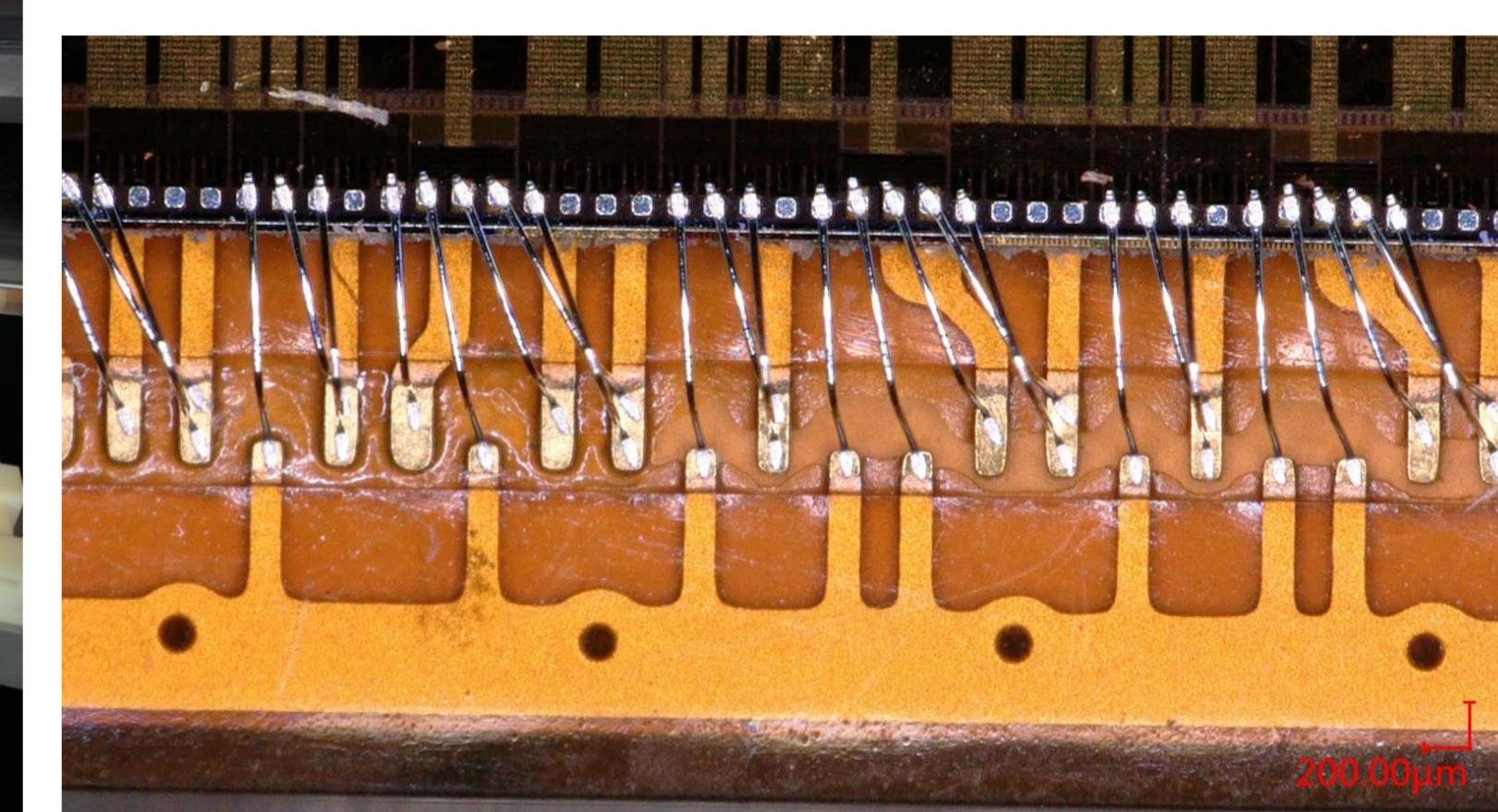
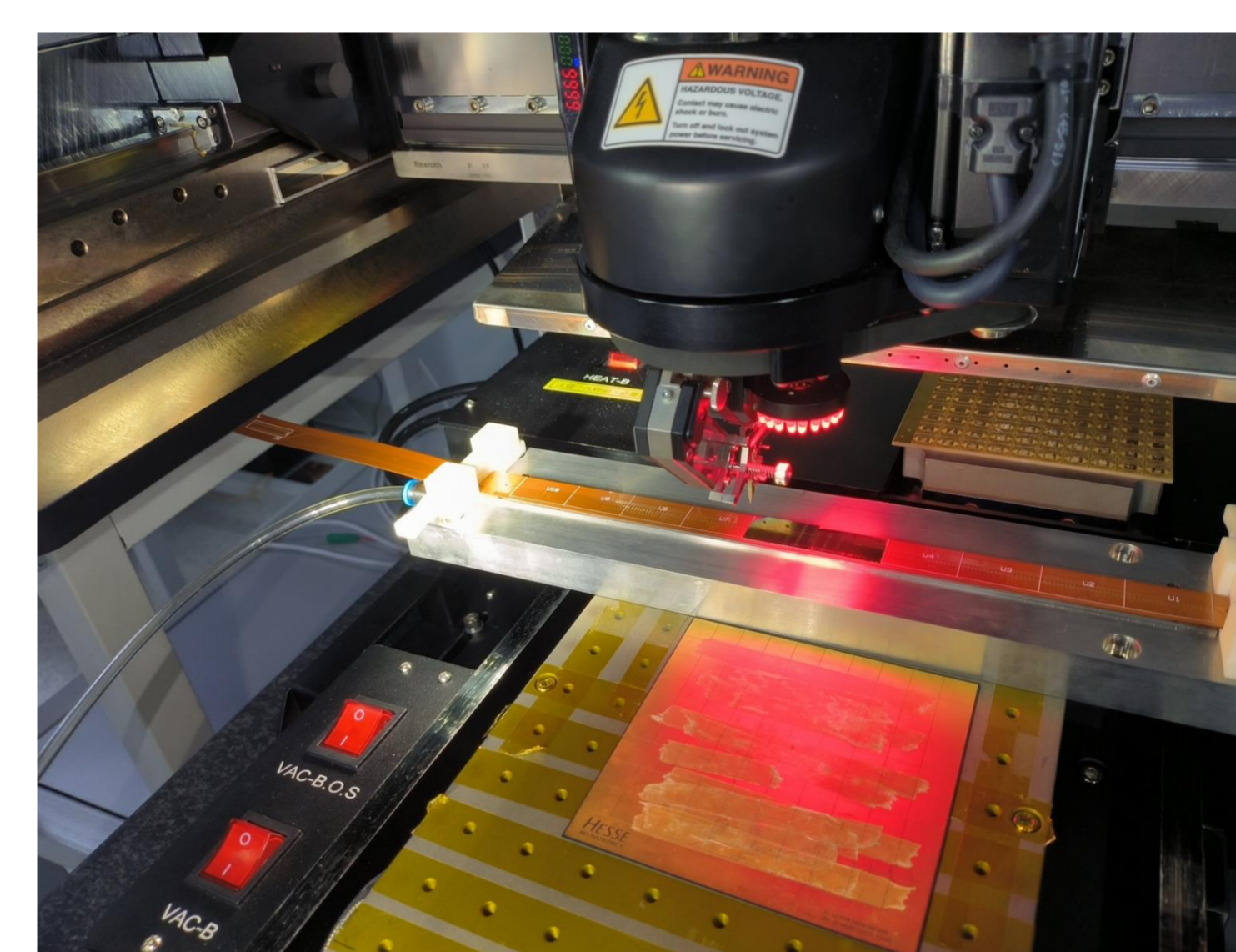
The Gantry system in IHEP

Robotic pick-and place for systematic module assembly (gantry)		
Motion	500mm * 500mm * 150mm * 340° travel, repositioning resolution ~ 1μm	
Vision	Keyence high resolution camera	
Sensor & Controller	Pressure	Nordson EFD Glue Dispensing Controller
Tooling	Custom tooling	Flexible vacuum, air pressure piping
Software	System: C++ Qt	Camera: Keyence recognition



Status in IHEP

- ✓ Assembly single dummy sensor manually.
- ✓ Gluing pattern design.
- ✓ Complete wire-bonding test.
- ✓ Primary assembly test for single dummy sensor (glass)



Task ongoing:

- ◆ Improve pattern recognition precision for alignment of 10 sensors on 1 flex.
- ◆ Improve the tooling design for sucking and pressing sensors for better glue coverage
- ◆ Optimize the parameters (especially pressure) and tooling design to avoid damage on the sensors.
- ◆ Design protection shell for modules after wire-bonding.

The specification is referred to HGTD TDR.

Glue thickness	50 ± 30μm
Gap between sensors	70 ~ 130μm

Summary

- This procedure is designed for assembly test and prototype assembly.
- We reach the precision with one single module assembly. The glue thickness and coverage can be controlled.

Outlook

- Design more custom tools and vacuum chucks.
- Develop the standard procedure for automatic module assembly.
- Develop the software for better HC interaction.

Dummy sensor (glass) assembly

