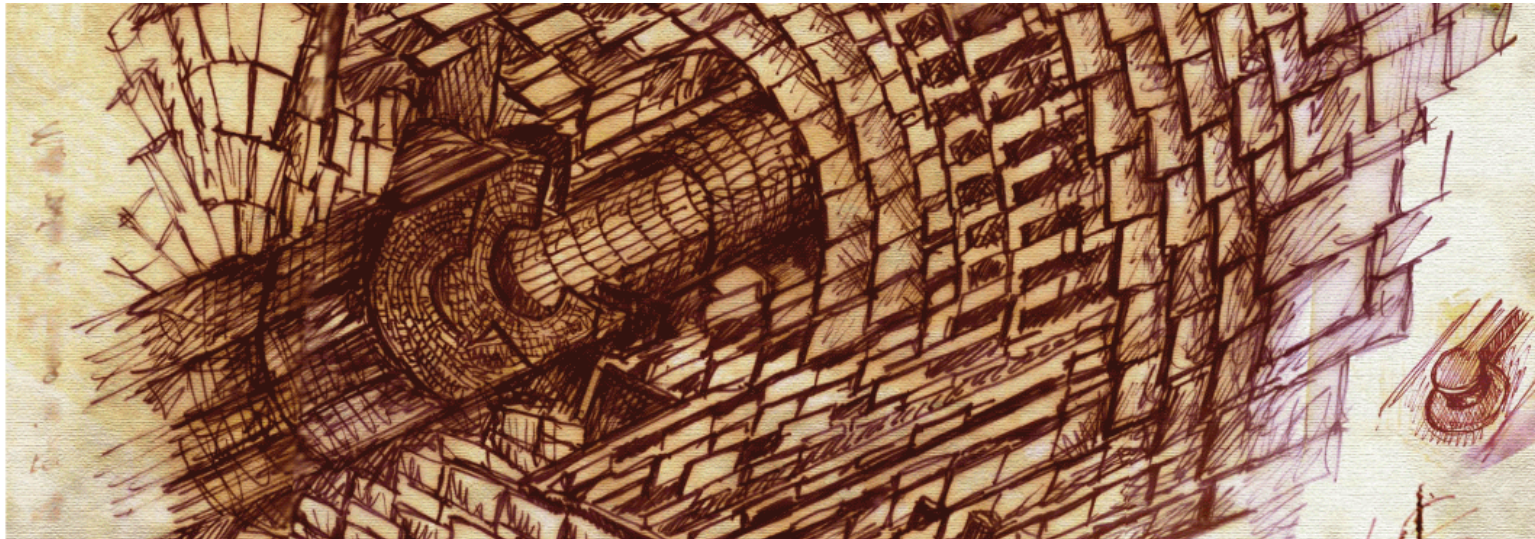


CMS Pixel Upgrade: Status of Module Production Line

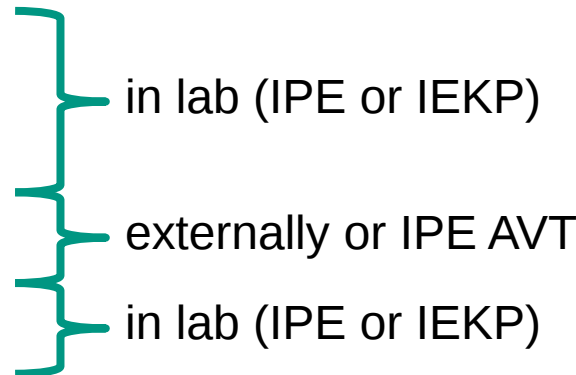
Stefan Heindl
Joint IEKP/IPE Meeting, 13.02.2012

Institut für Experimentelle Kernphysik



1. Overview of Module Production

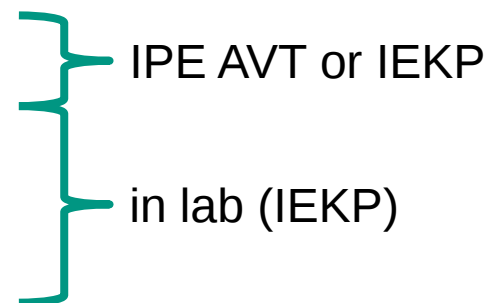
■ Preparatory work:

- Sensor testing
 - ROC wafer probing and testing
 - HDI wire bonding and testing
 - Bump bonding: Sensors to ROC
 - Bare module testing
- 
- in lab (IPE or IEKP)
- externally or IPE AVT
- in lab (IPE or IEKP)

■ Work at clean room (building 245):

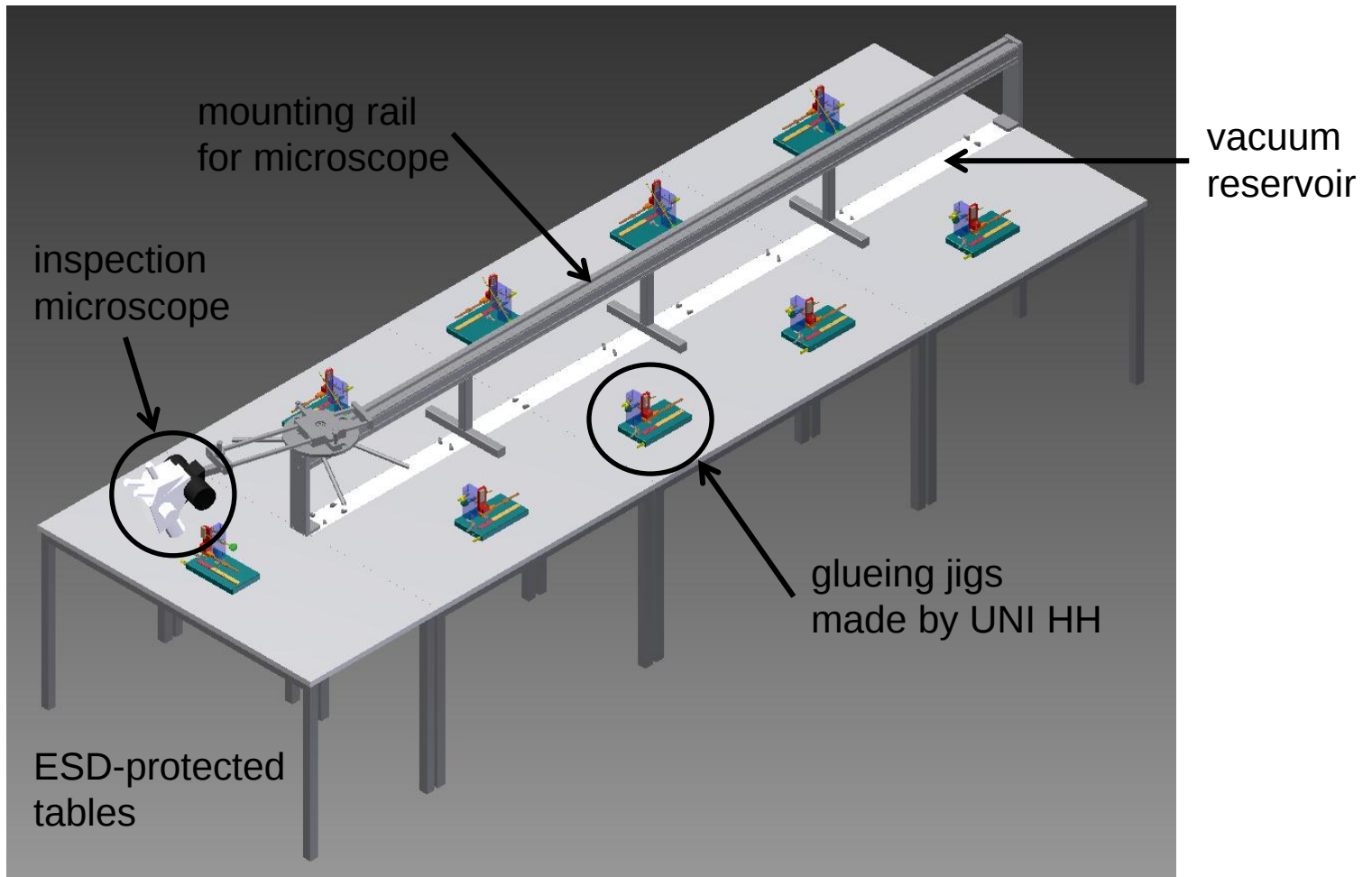
- All glueing steps (assembly of **complete modules**)

■ Completion:

- Wire bonding: ROC to HDI
 - Electrical testing
 - (X-ray calibration?)
 - Shipment to **Aachen** for cold tests and calibration
- 
- IPE AVT or IEKP
- in lab (IEKP)

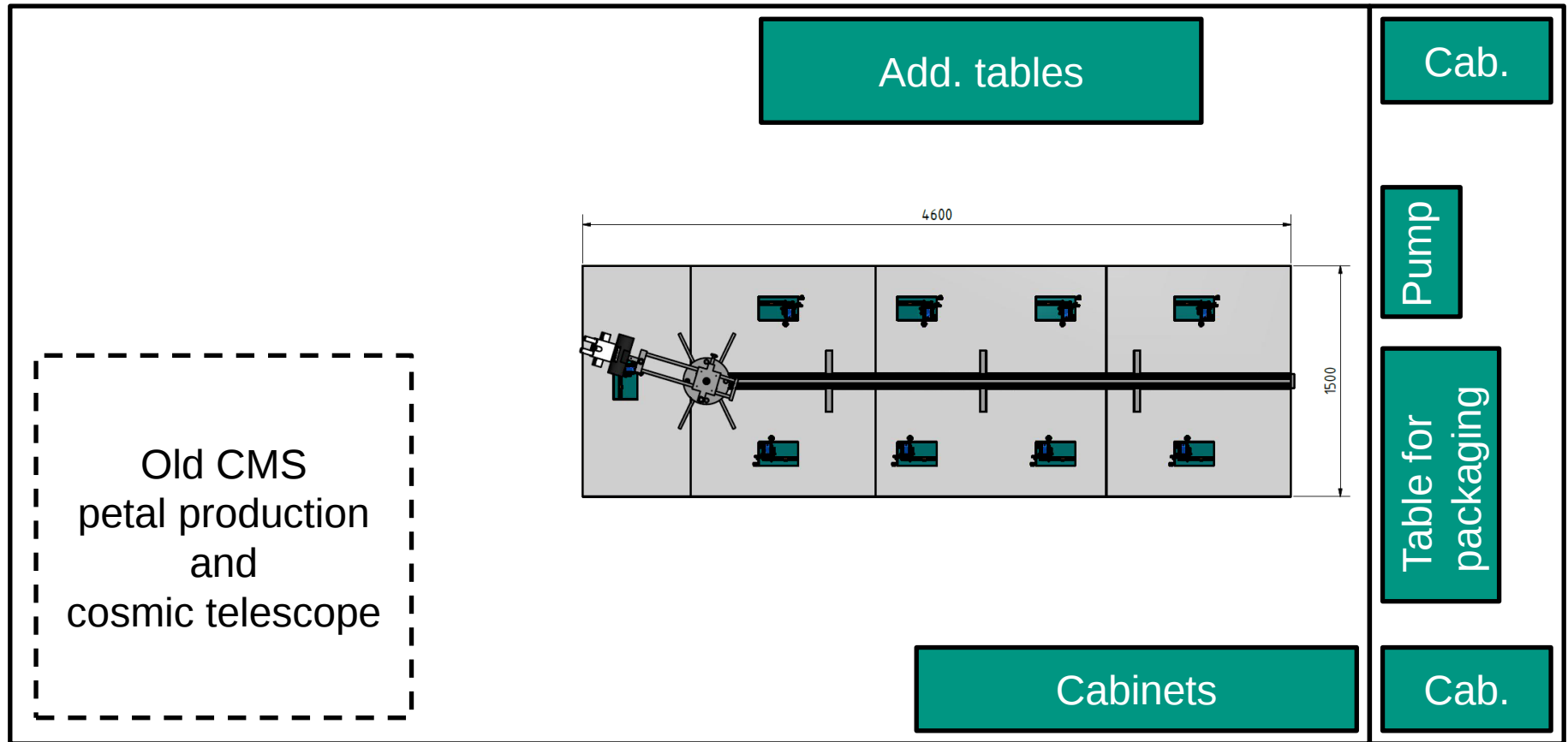
2. Layout of Production Line

- 3D view of module production line:



2. Layout of Production Line

- Proposed layout of module production line in clean room:



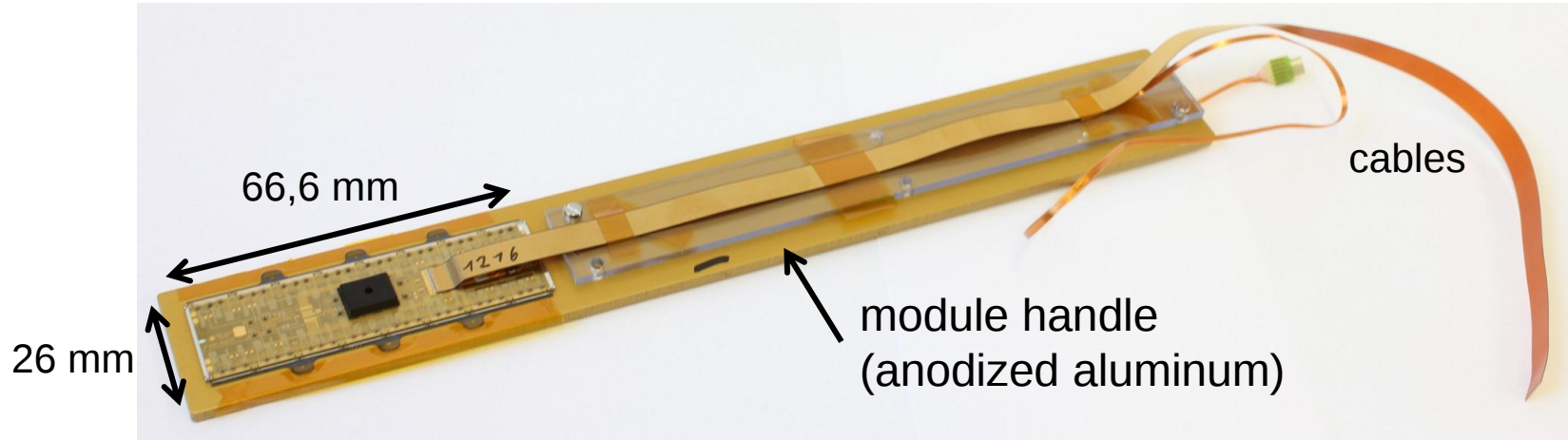
(not to scale)

Clean room (10 m x 6 m)

Tent

3. The Pixel Detector Module

- How a module will look like:



- IEKP has agreed to design and manufacture the **module handle** (aka „spoons“) for all German sites
- New handle is different from old one due to new cable (one micro twisted-pair cable for data and power, about **1 m long**)
- Cable needs to be **stored on handle** for transport
- Design has not started up to now because **cable samples are not available** (but in contact with PSI)

4. Items to purchase (1): for production

- ESD-protected tables (2), Treston, ~1k€
- Vacuum pump, Pfeiffer Vacuum, ~1,8k€
- Vacuum tank, aluminum tube (100 x 100 mm²), ~300€
- Vacuum parts (valves, hoses, etc.), Festo, ~500€
- Inspection microscope, Nikon, ~2,5k€
- Mounting rail for microscope, Igel, ~1k€
- Additional mounting parts, ~500€
- PC for assembly documentation, ~400€
- Module handles for KIT and UNI HH (800), ~4k€

- **Subtotal (production): 12k€**

4. Items to purchase (2): for testing

■ Test stations:

- Water chiller, Fryka, ~3k€
- PCBs for Single Chip modules, CERN/NTU, ~500€
- Test boards for new ROC chip (3), PSI/RAL, ~3k€

■ Chip probing:

- Probe card for new ROC chip, Technoprobe, ~1,5k€
- Test board for new ROC chip, PSI/RAL, ~1k€
- Readout PC, ~400€

■ Subtotal (testing): 9,4k€

■ Grand total (1+2): 21,4k€

5. Schedule

- **This week:** Requests for quotations for water chiller and tables
- **Ongoing:** Definition of exact specifications for other items of production line, design (and manufacturing) of module holders
- **March:** Prepare clean room and tent for installation of production line (removal of items from petal production)
- **June/July:** Upgrade of test stations to support new ROC chip
- **Second half of the year:** Setup of production line and test of individual components
- **End of the year/beginning of 2013:** first prototype production for learning purposes and qualification of production centers