Status of the MPD ITS module assembly at JINR

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Supported by AYSS JINR
21-102-12

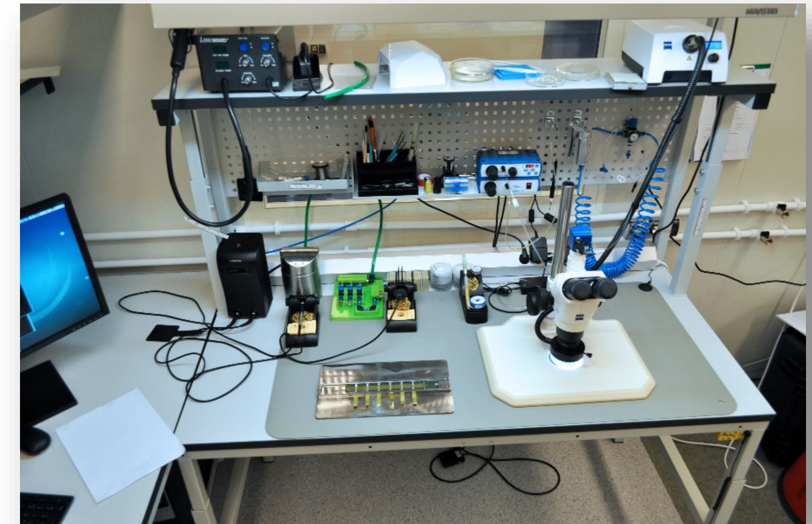
Overview

- Infrastructure preparations at LHEP, JINR
- Major steps for building of the MPD ITS sensitive part
- ITS Module (HIC) assembly workflow
- Summary and Outlook

Infrastructure preparations at LHEP, JINR

Production line readiness for **assembly** of the ITS modules i.e Hybrid Integrated Circuits (HIC)

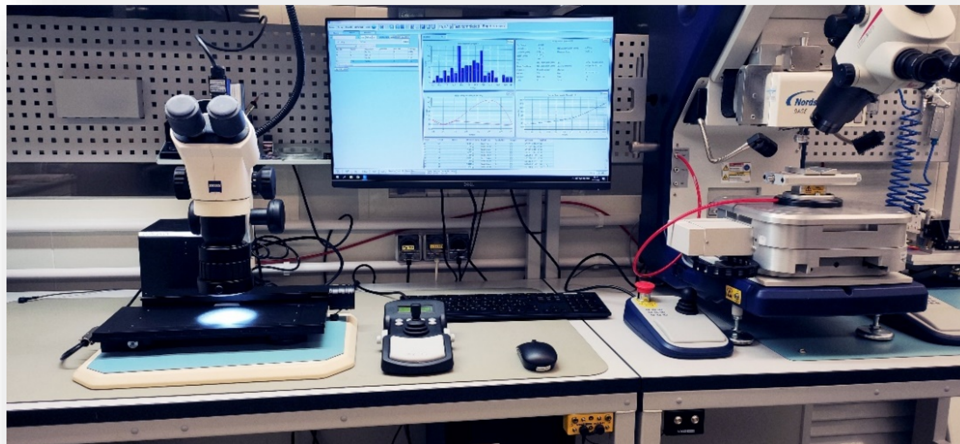
- Clean room ISO6 ~30 m^2 (ready)
- Pick&Place robot ALICIA-8 has been installed and configured for integration of 14pcs 100 μm MAPS chips into module together with special jigs and tooling (ready)
- F&K Delvotec G5 ultrasonic wire bonding has been configured for bonding HIC (ready)



Infrastructure preparations at LHEP, JINR

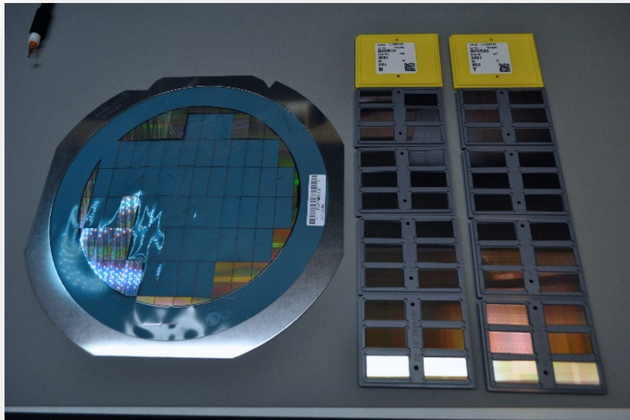
Production line for **testing** of Hybrid Integrated Circuits (HIC):

- Soldering and assembly Flexible Printed Circuit (FPC) (ready)
- Qualification/endurance test setups: (not ready)
- Pull tester DAGE4000+ (ready)
- Peel force tester Multitest i1 (ready)



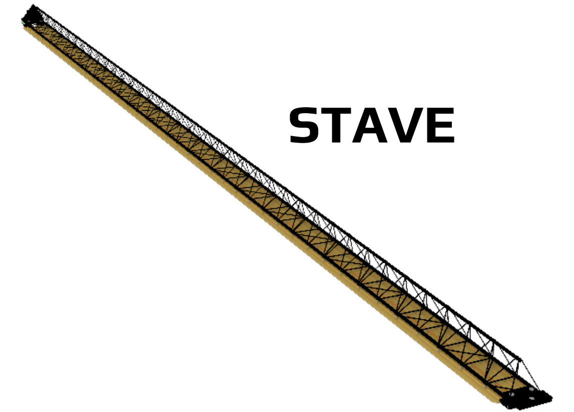
Major steps for building of the MPD ITS sensitive part

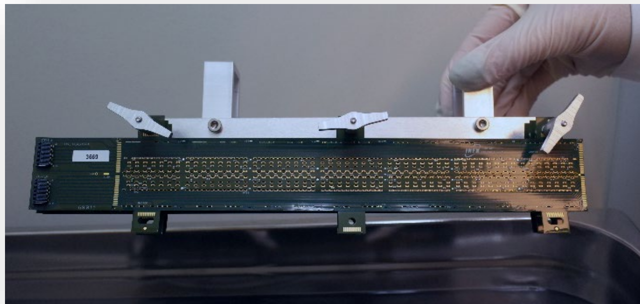
ALTAI MAPS chips



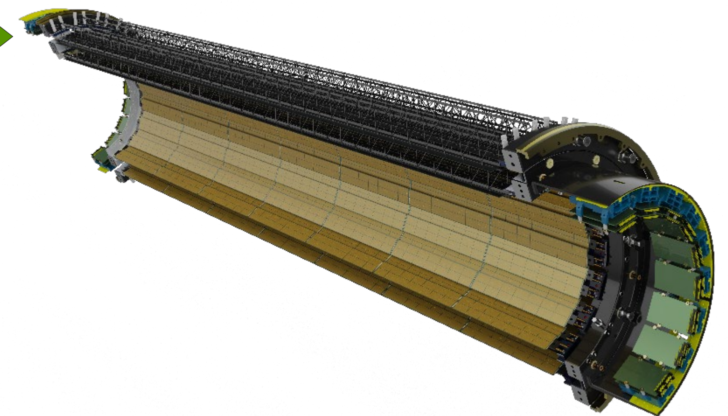
Hybrid Integrated Circuits (HIC)

STAVE



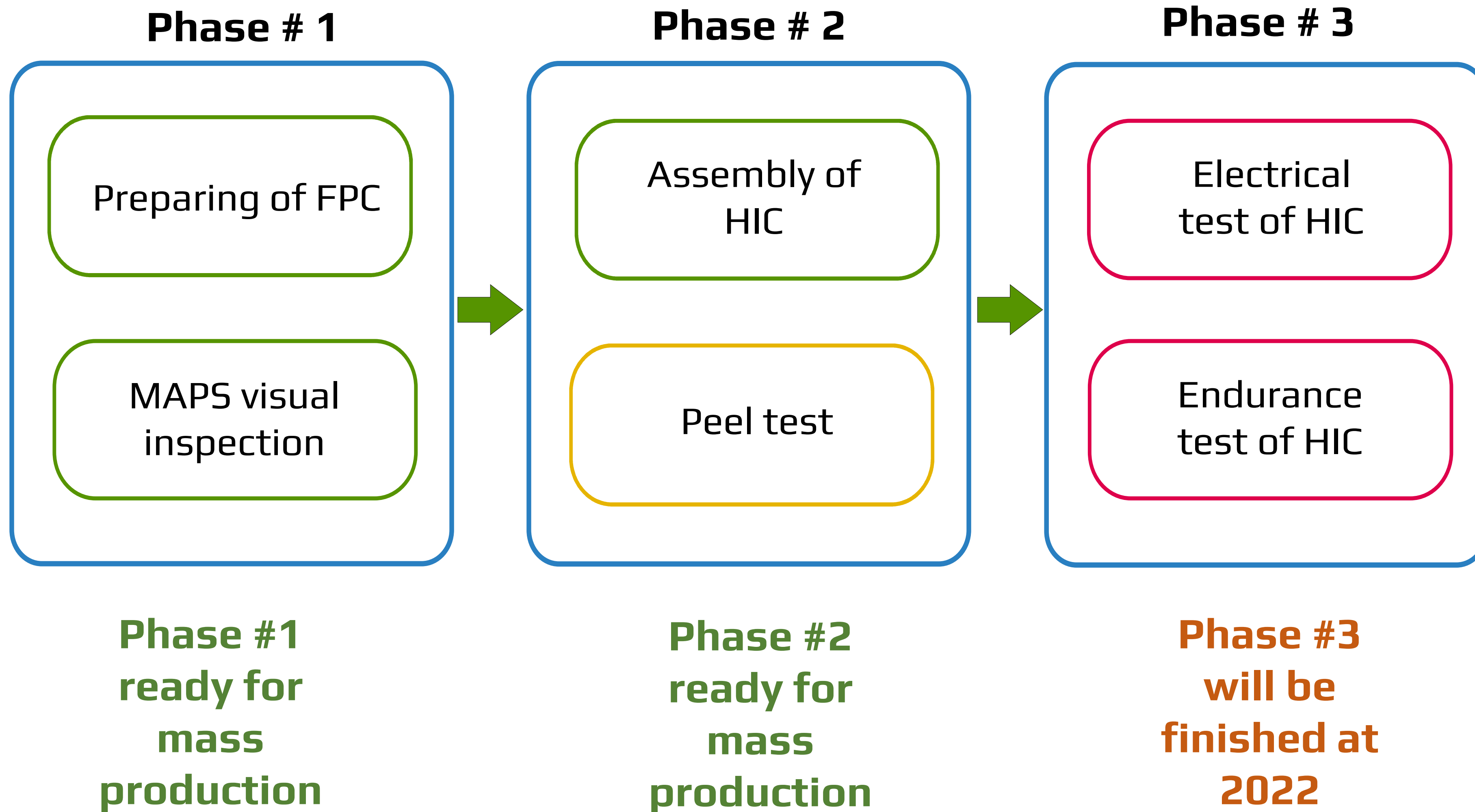


Flexible Printed Circuit (FPC)



ITS Layer 4 = 18 STAVEs
ITS Layer 5 = 24 STAVEs

Assembly stages for Hybrid Integrated Circuits (HIC)

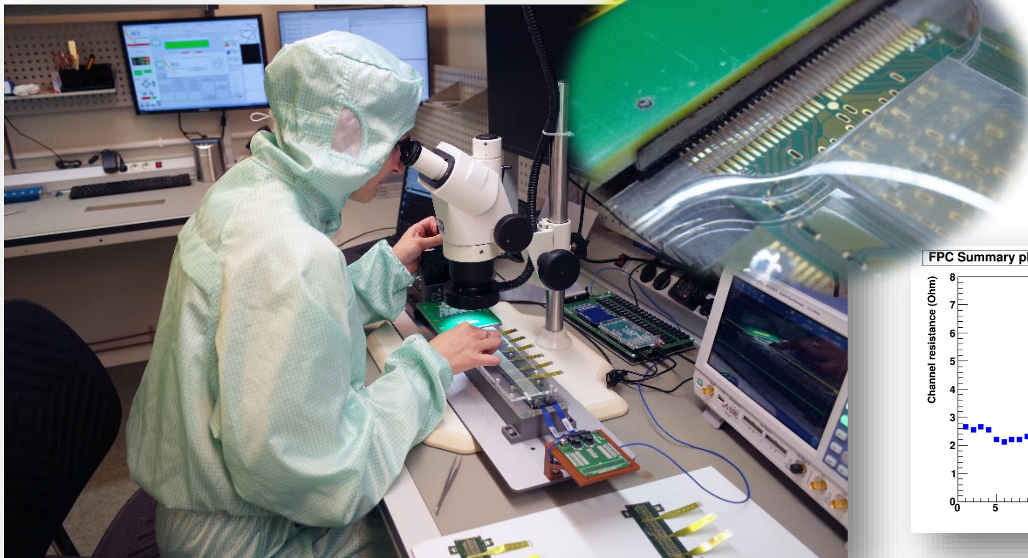


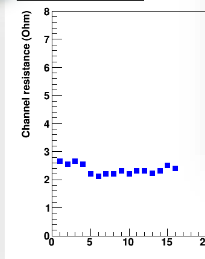
NICA

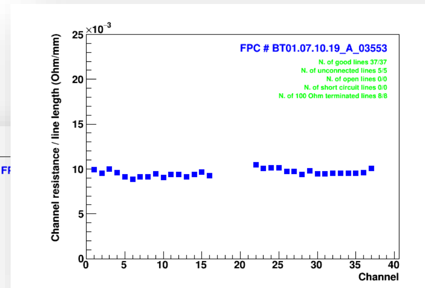
Assembly stages for ITS detectors parts "Phase # 1"

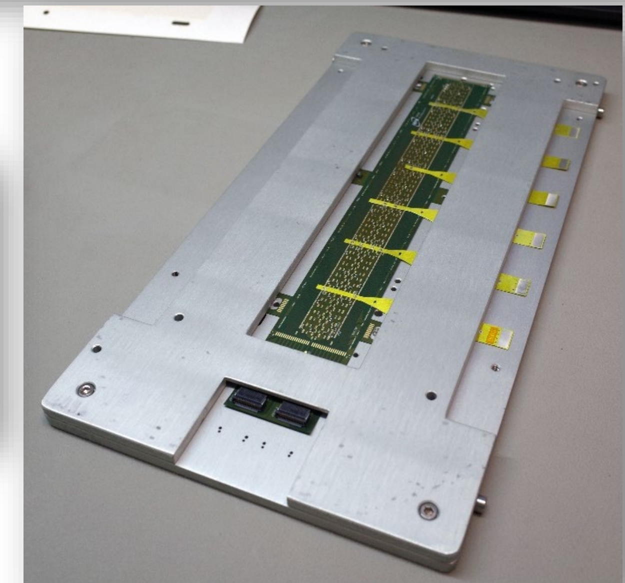
Workflow of preparing the FPC:

- Cross-cable soldering to the FPC
- Cleaning the FPC in an ultrasonic bath
- Impedance test of the FPC
- Storage on the carrier plates



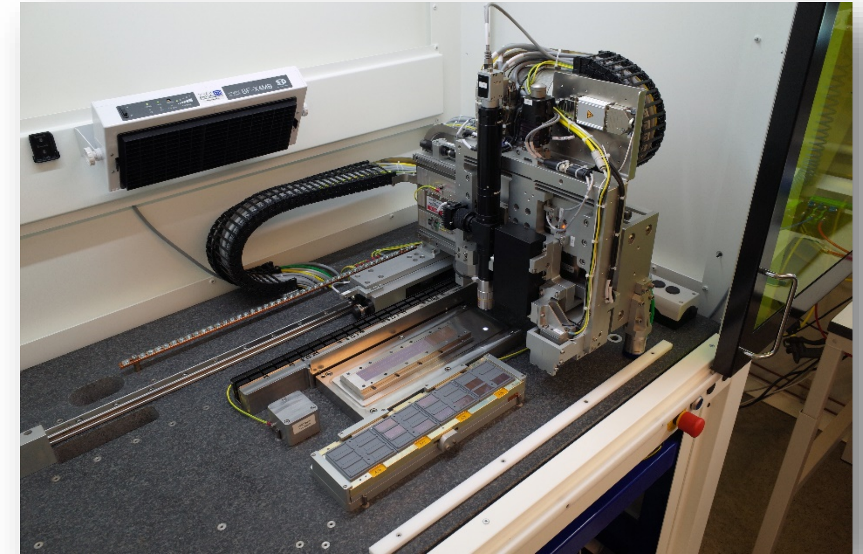




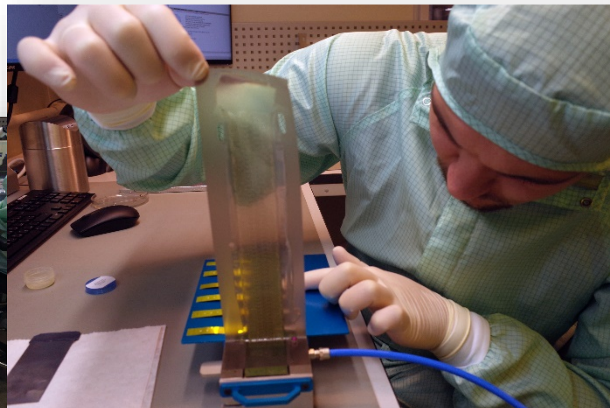


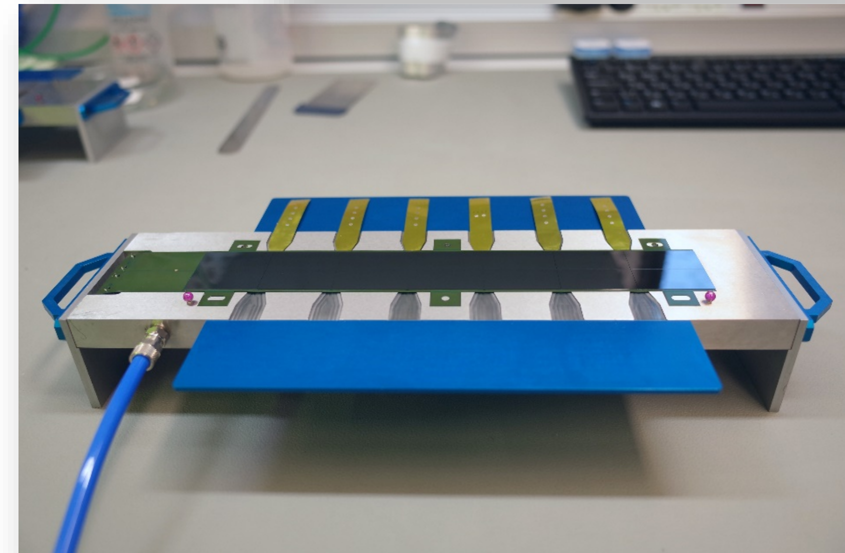
Assembly stages for ITS detectors parts "Phase # 2"

Sensors FPC mounting workflow :



- Alignment of sensors with the help of ALICIA-8
- Gluing sensors to the FPC
- Wire bonding with the help of Delvotec G5
- Peel test of wire bonds quality of HIC
- HIC pull test (optional)





Assembly stages for ITS detectors parts "Phase # 3"

Electrical test of HIC:

- IV curve measurement
- Test with IR camera
- Electrical test of Single HIC
- Endurance test of 10 assembled HICs

Will be ready for series production by Quarter 1st of 2022

Summary and Outlook

- ✓ Infrastructure for the ITS module (HIC) assembly is ready for series production
- ✓ Test bench for electrical tests of assembled HICs is acquired but waits for the new clean room commissioning scheduled for Quarter 1st of 2022
- ✓ Technical staff trained in HIC assembly stages
- ✓ Start of the series HIC production at LHEP is scheduled for the fall of 2022 provided the MAPS for NICA production of which just started at Tower Semiconductor in Israel are available

Thank you for the attention !