

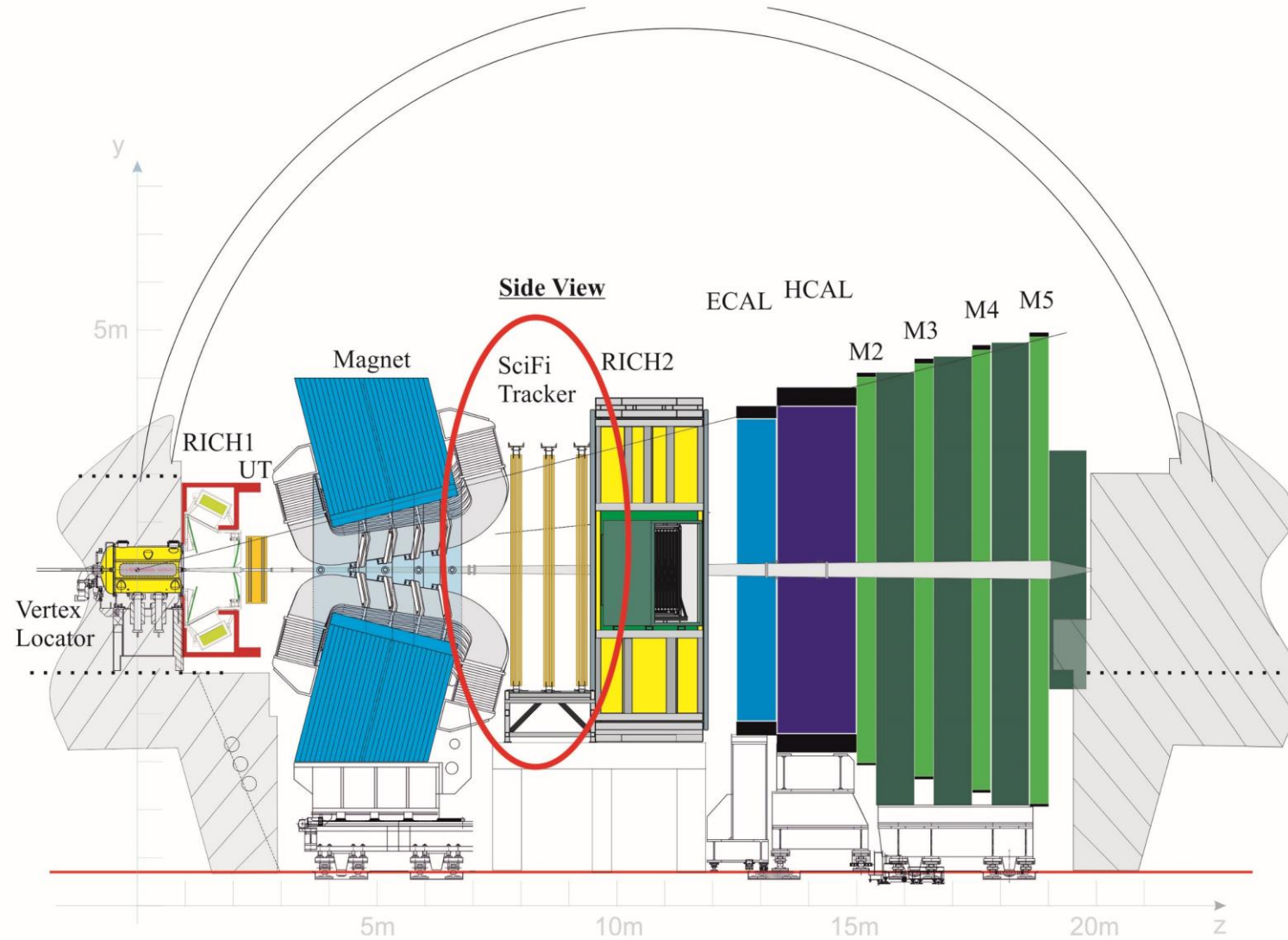


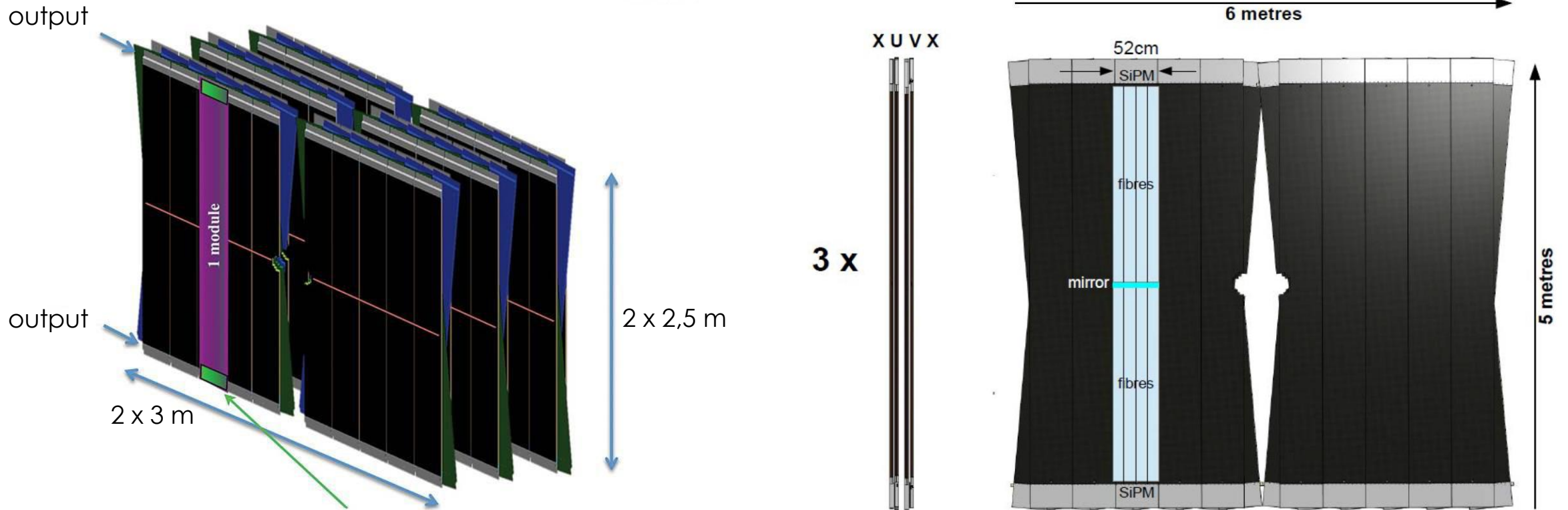
# SciFi modules production in NRC KI for LHCb upgrade

A.N. Petrov, A.A. Dolmatov, A.G. Malinin, V.I. Shevchenko  
NRC KI «Kurchatov Institute», Moscow, Russia.



# LHCb experiment at the LHC (CERN)

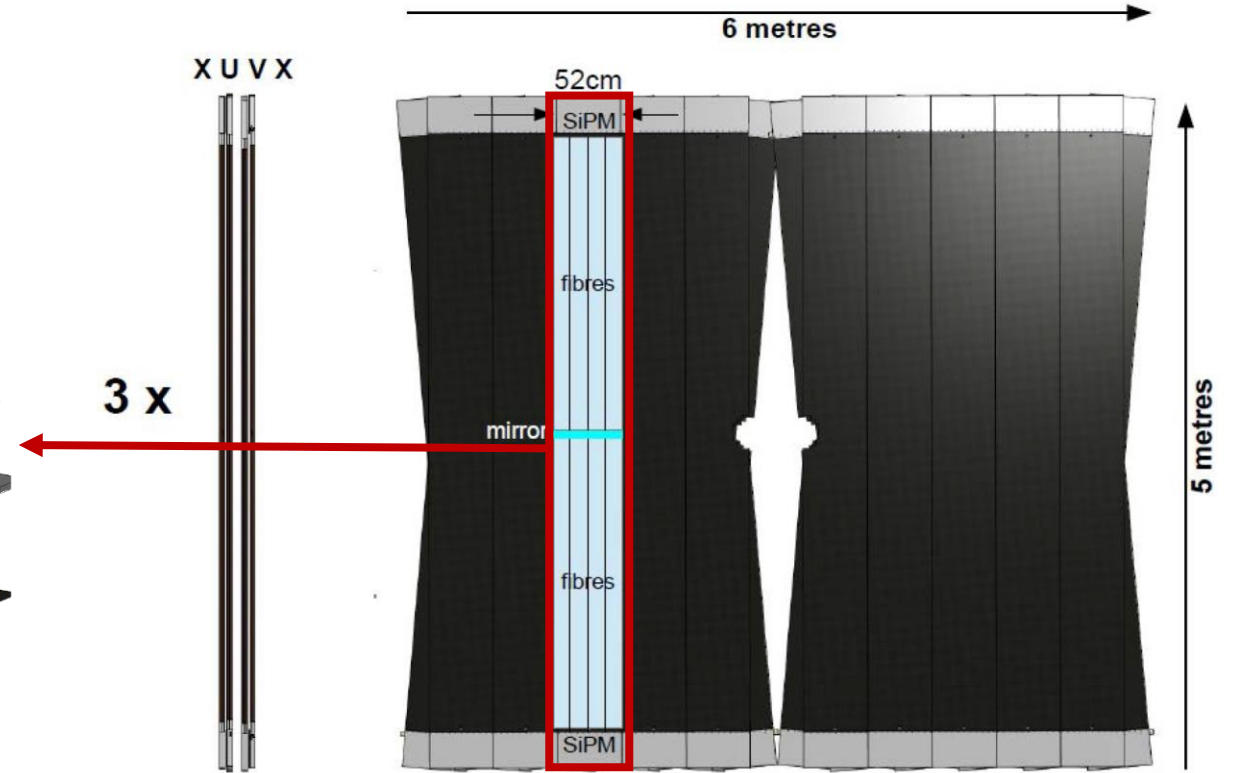
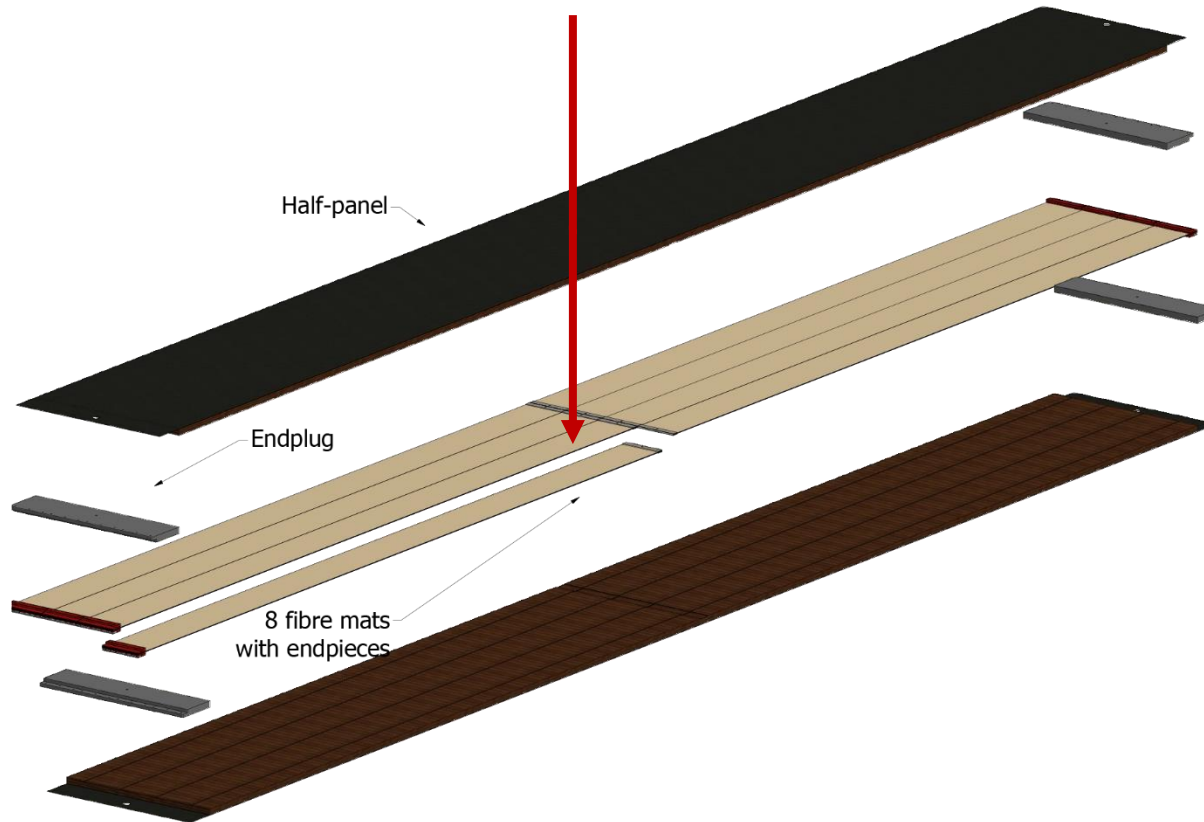




- Fibers readout at top and bottom
- SiPMs + FE electronics + services in the Readout Box

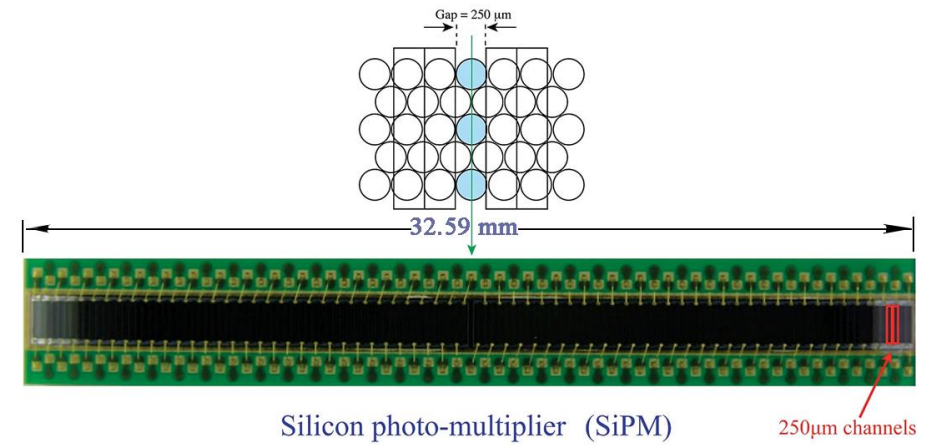
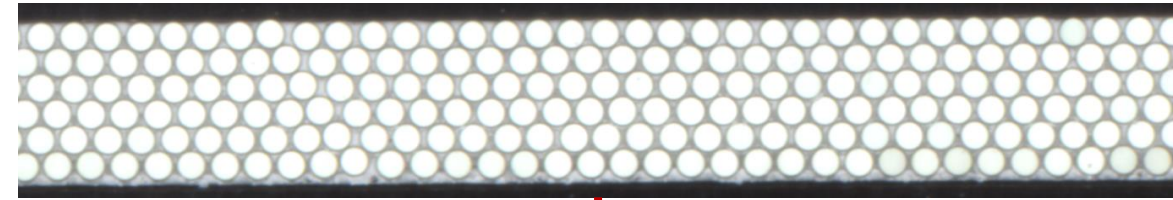
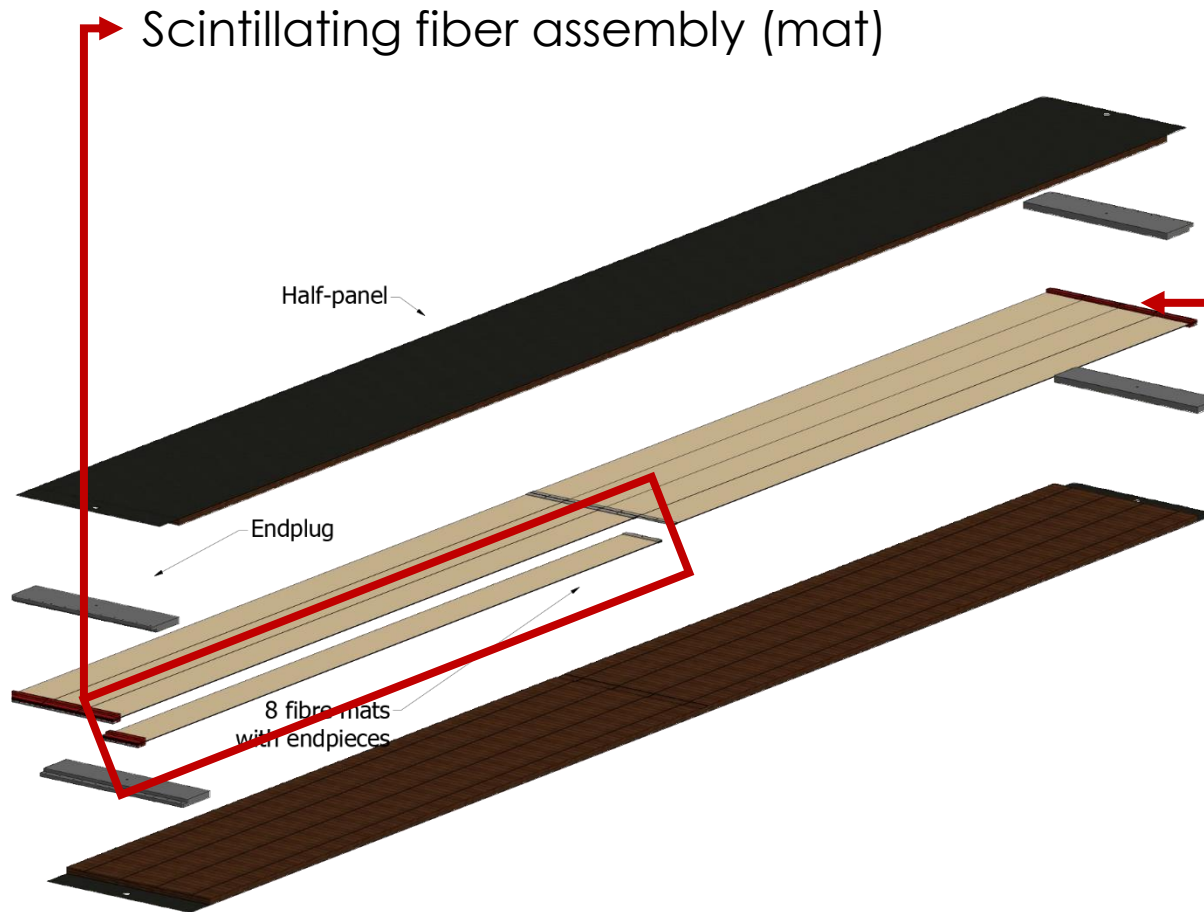
- 3 stations
- 4 detection planes (XUVX) per station
- 12 modules per detection plane
- 16 SiPMs per module (width ~530mm)

8 scintillating fiber assemblies  
in a module



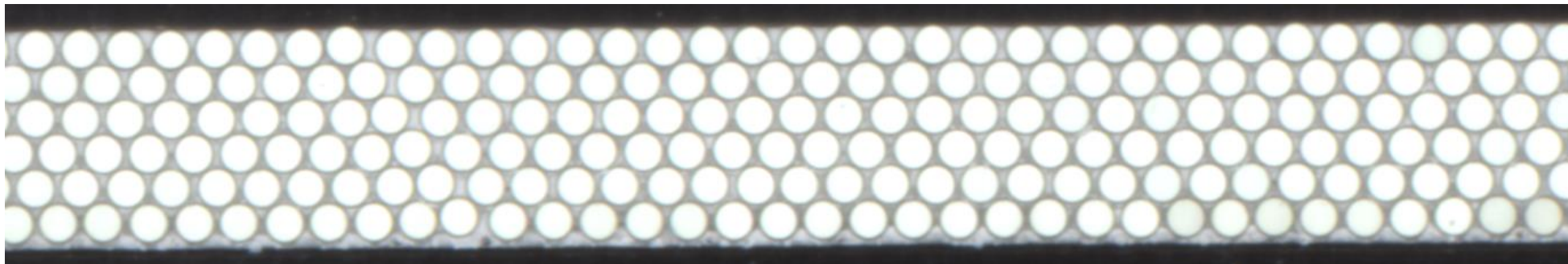
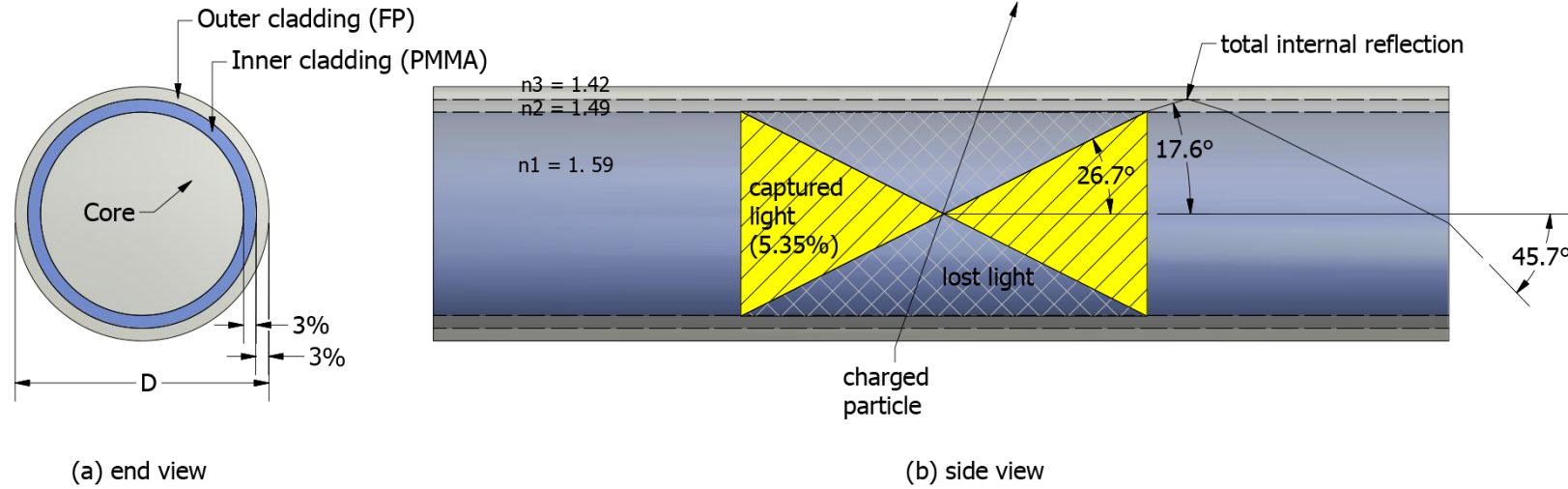


# SciFi-tracker design



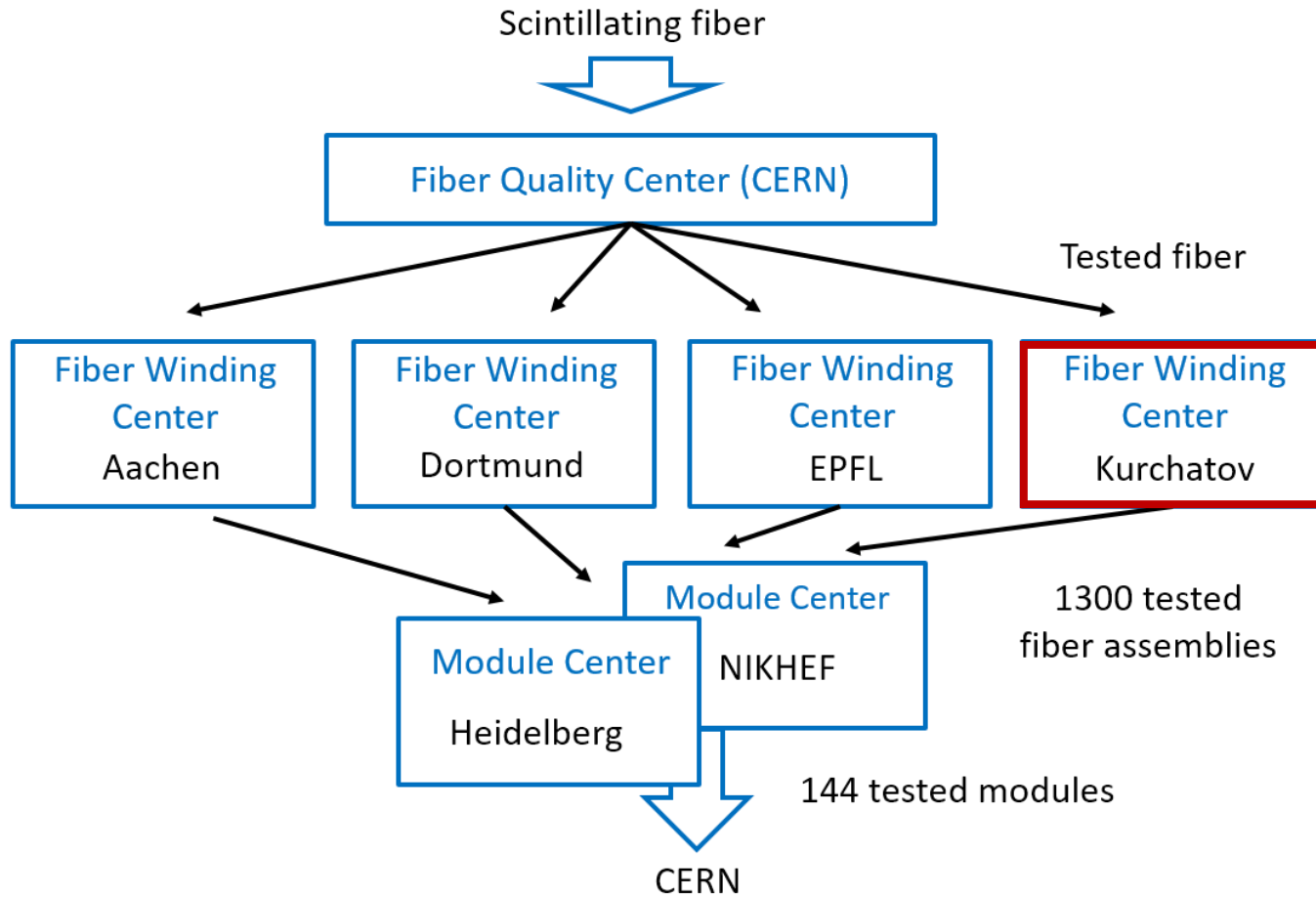


# Scintillating fiber

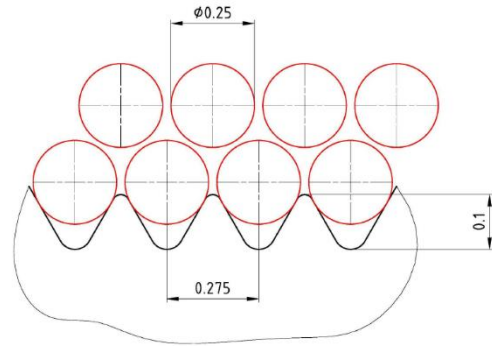
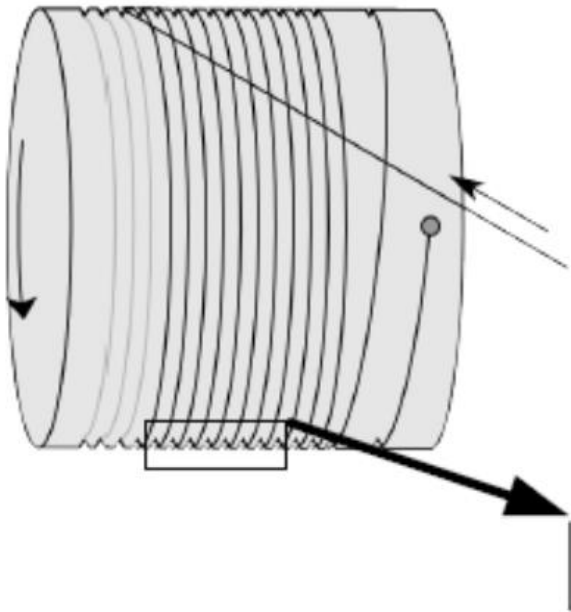




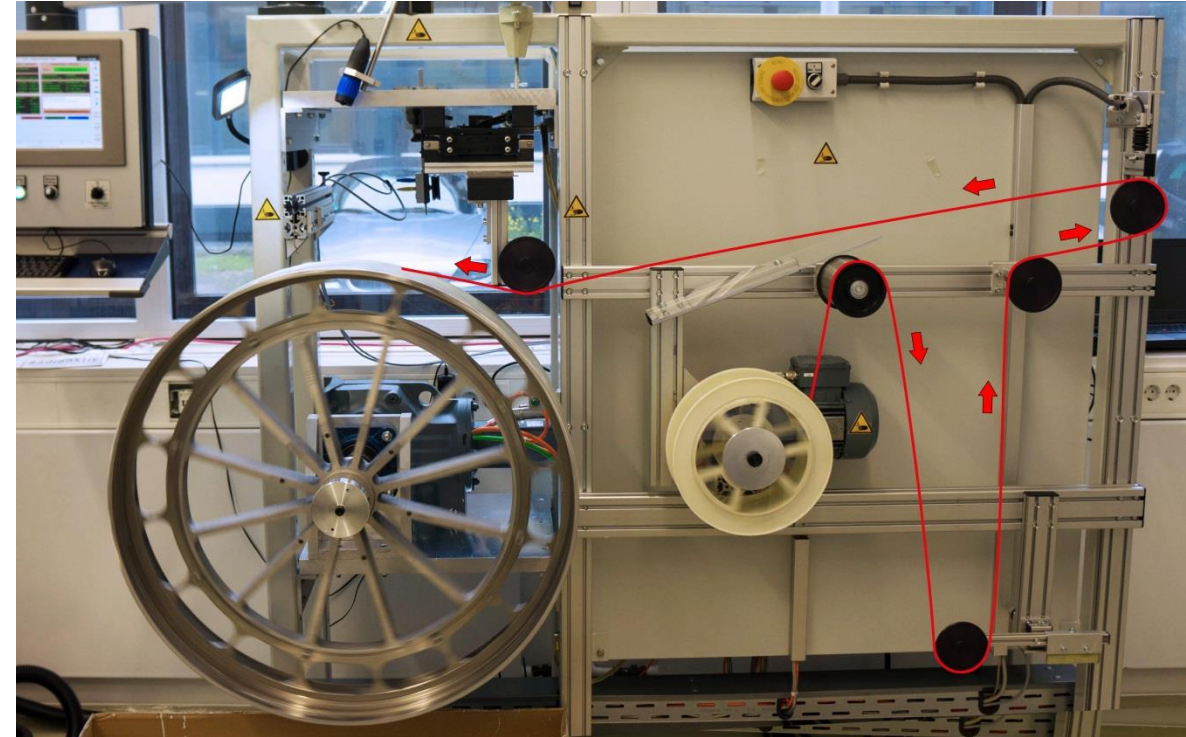
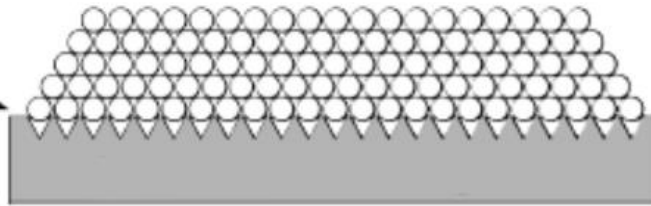
# SciFi modules series production



Stainless steel wheel



6 layers



Scintillating fibers assembled by winding and bound together with the epoxy glue



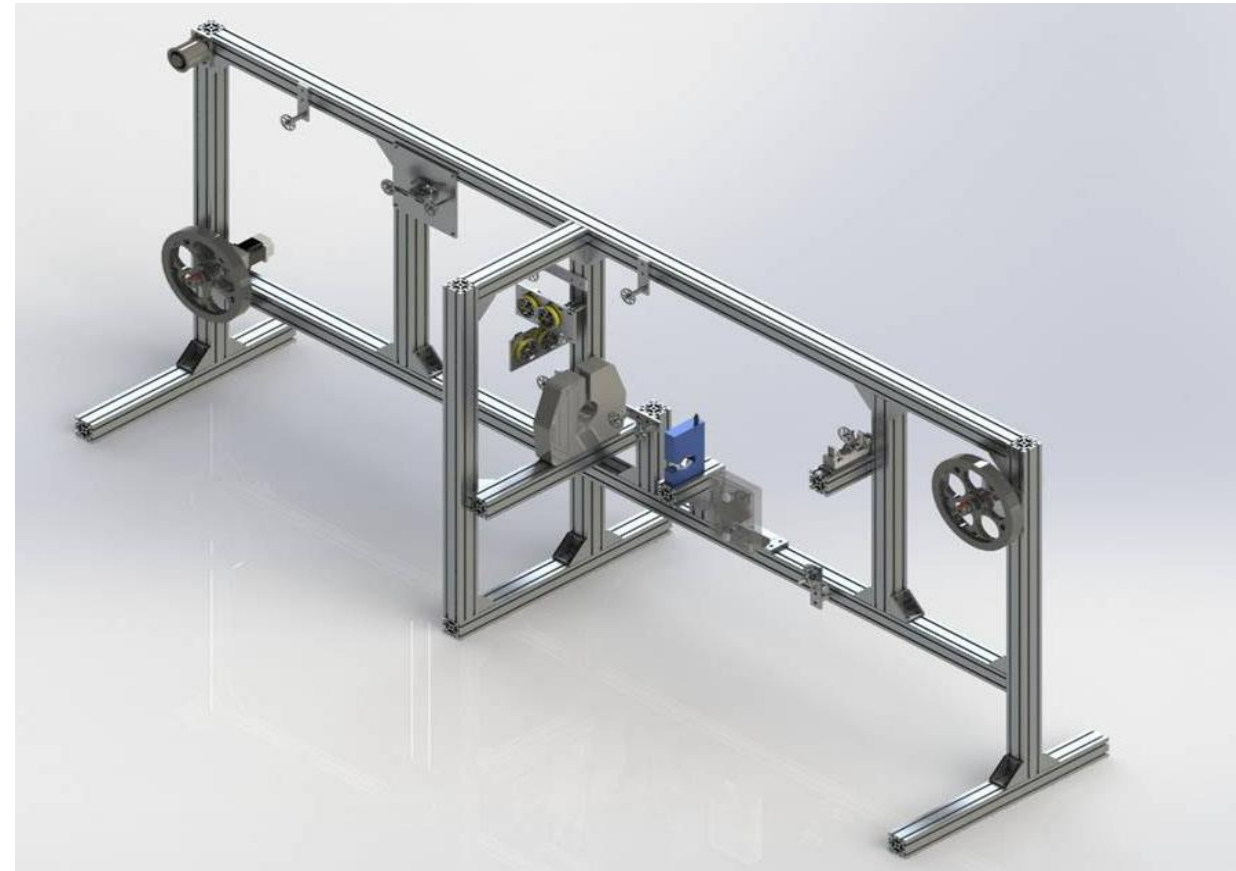
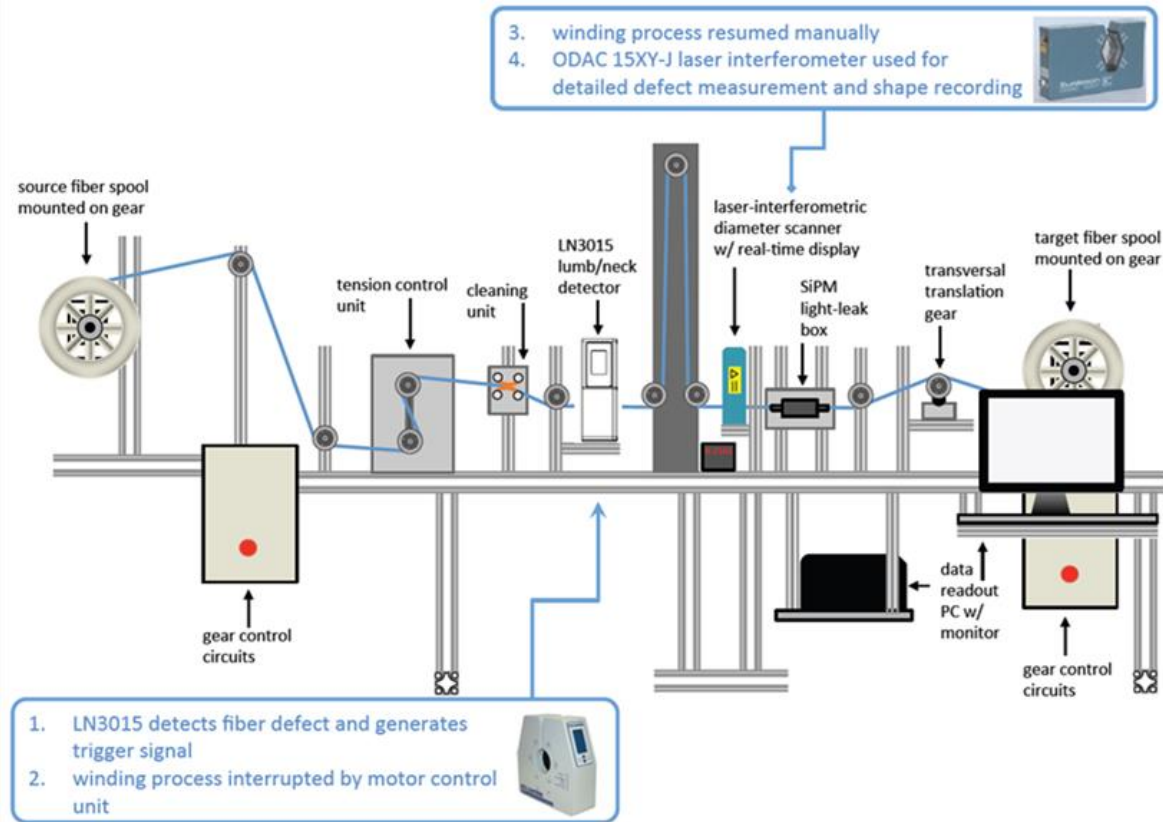


# Fabrication technology of SciFi assemblies



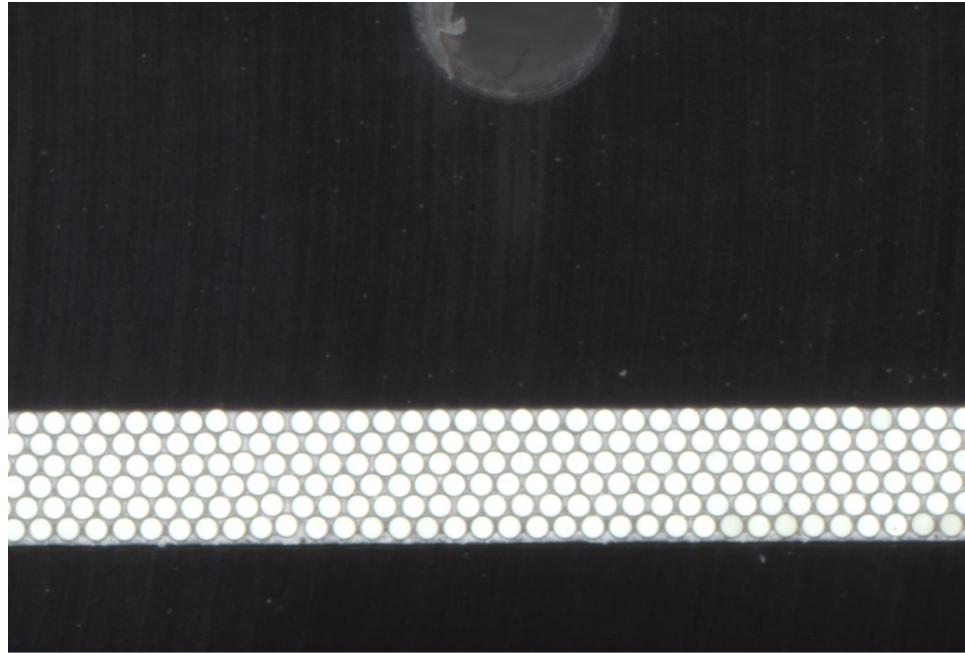


# Quality assurance of SciFi assemblies

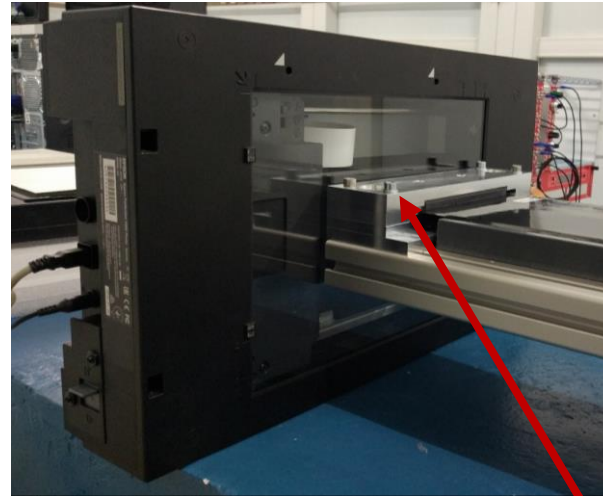




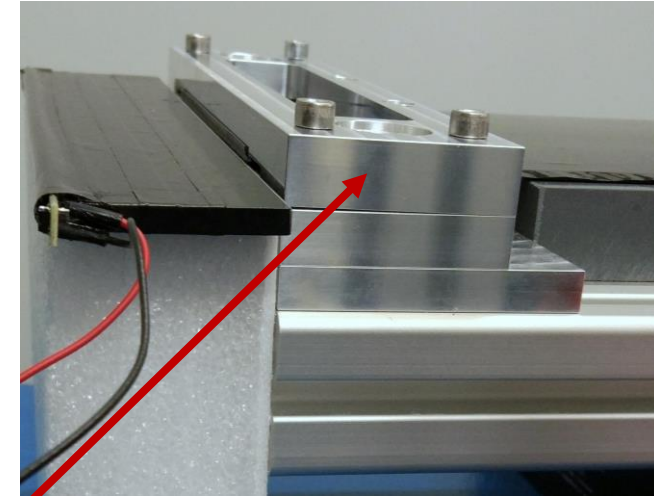
# Quality assurance of SciFi assemblies



Scanner



LED bar

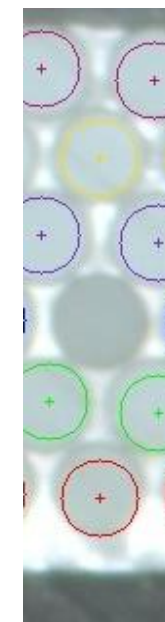
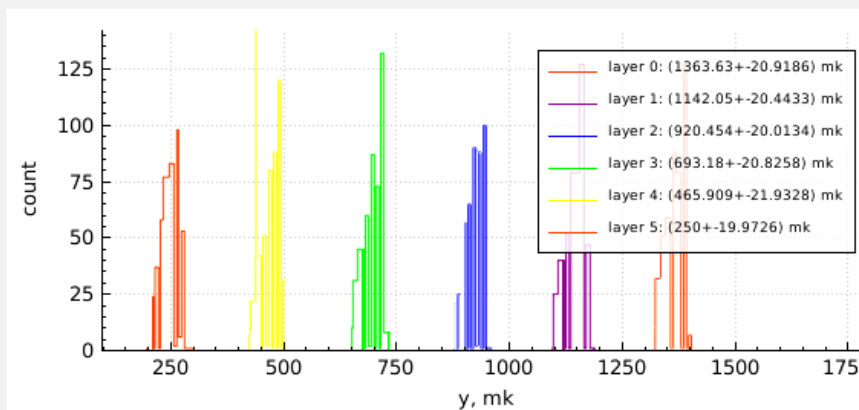
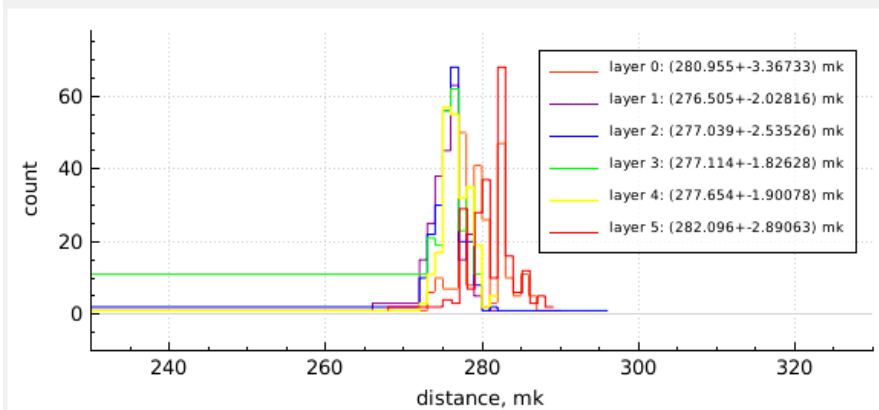
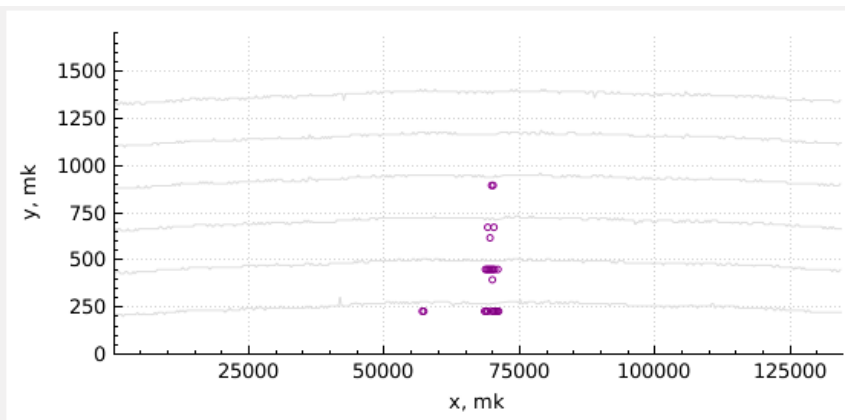
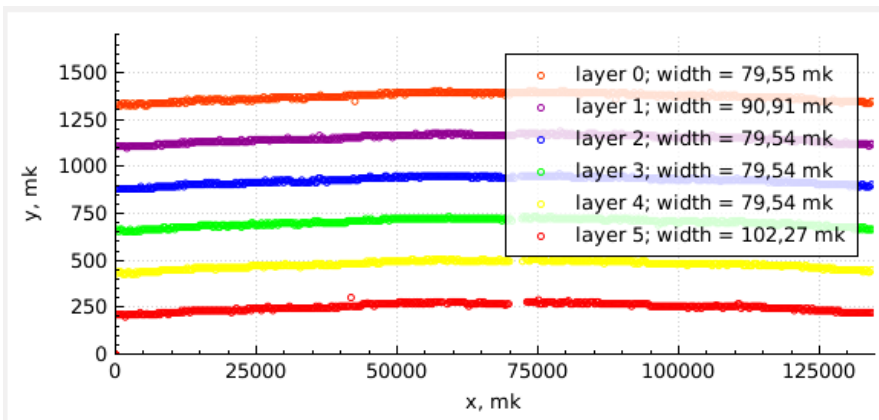
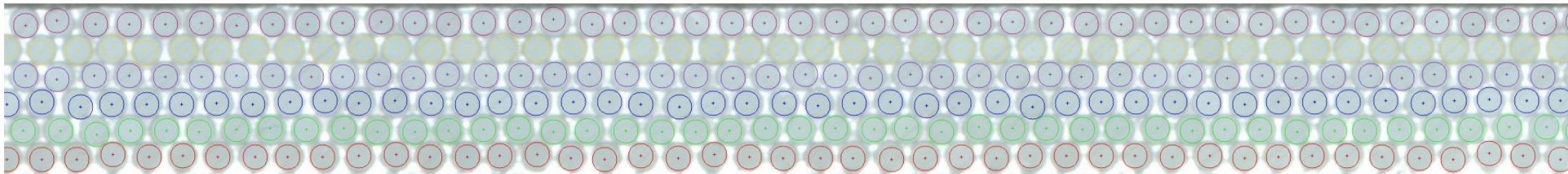


Clamped mat end





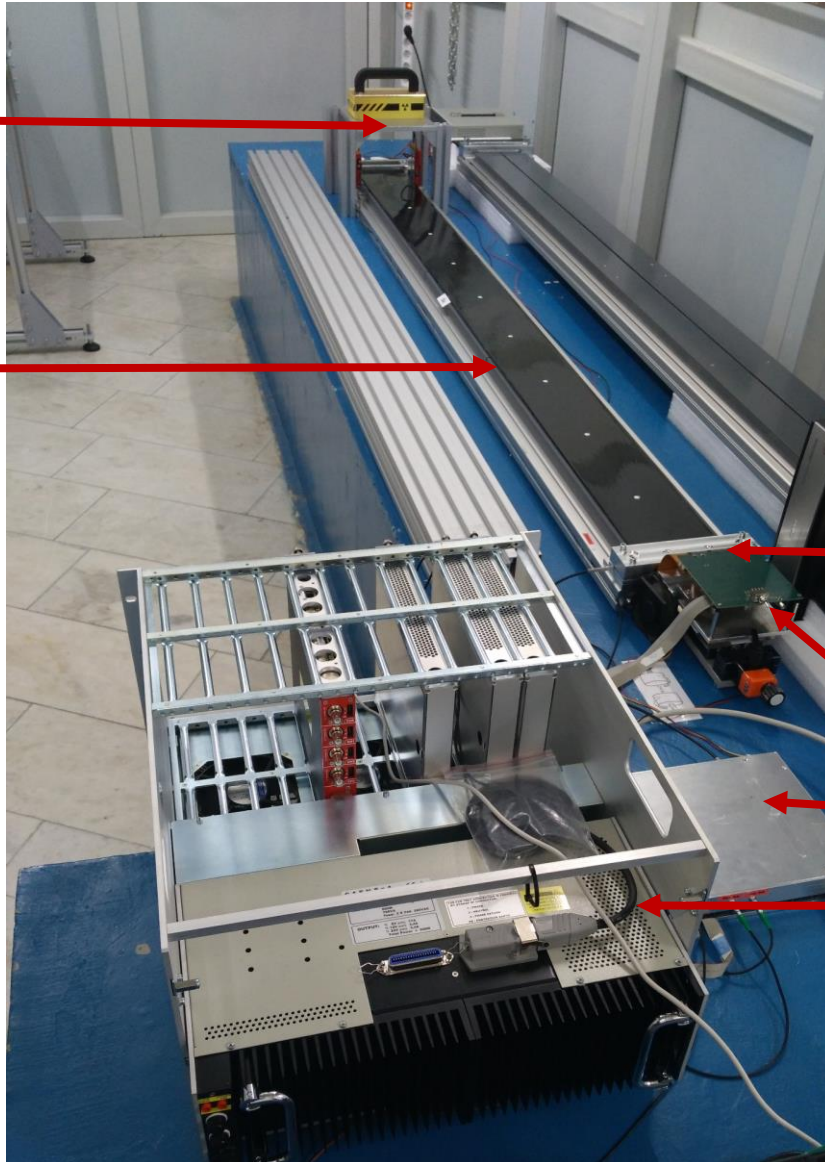
# Quality assurance of SciFi assemblies



# Quality assurance of SciFi assemblies

$^{90}\text{Sr}$  source

A SciFi assembly



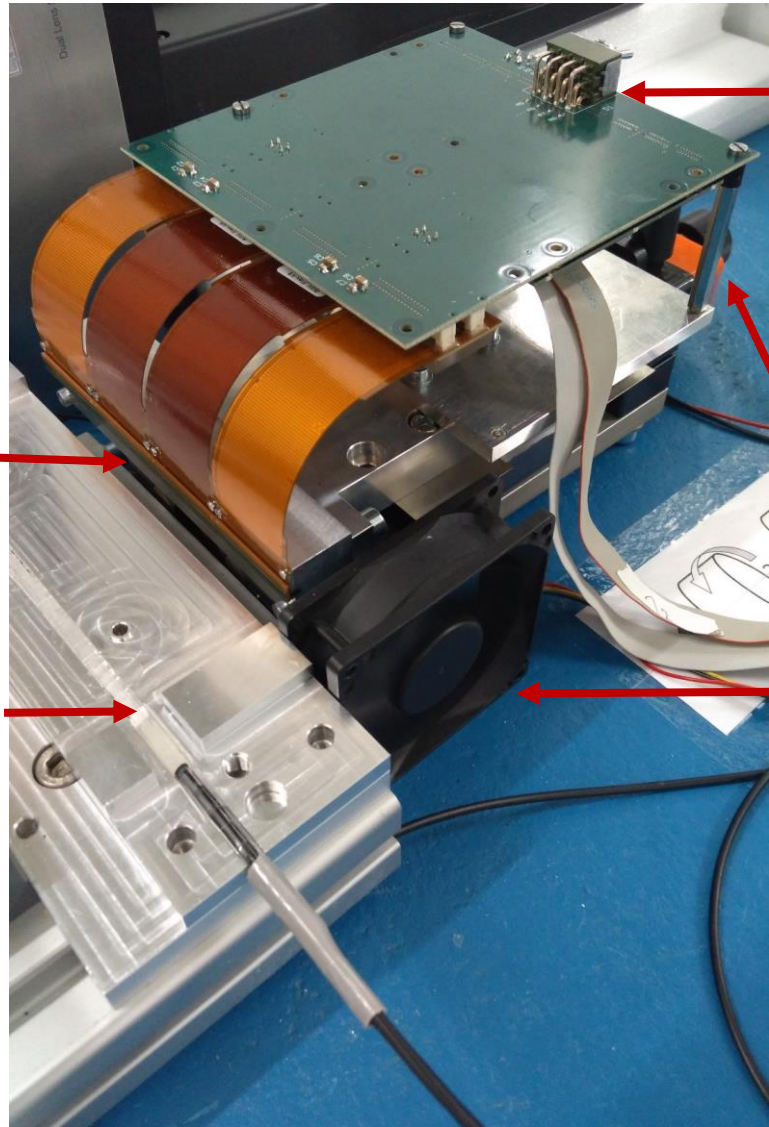
SiPM array

SPIROC readout

USB Board

Trigger NIM crate





SiPM arrays

Light bar

SPIROC readout

Horizontal alignment

Cooler

$^{90}\text{Sr}$  uncollimated radioactive source with activity 1,3 MBq under 4 cm brass shielding



Trigger system

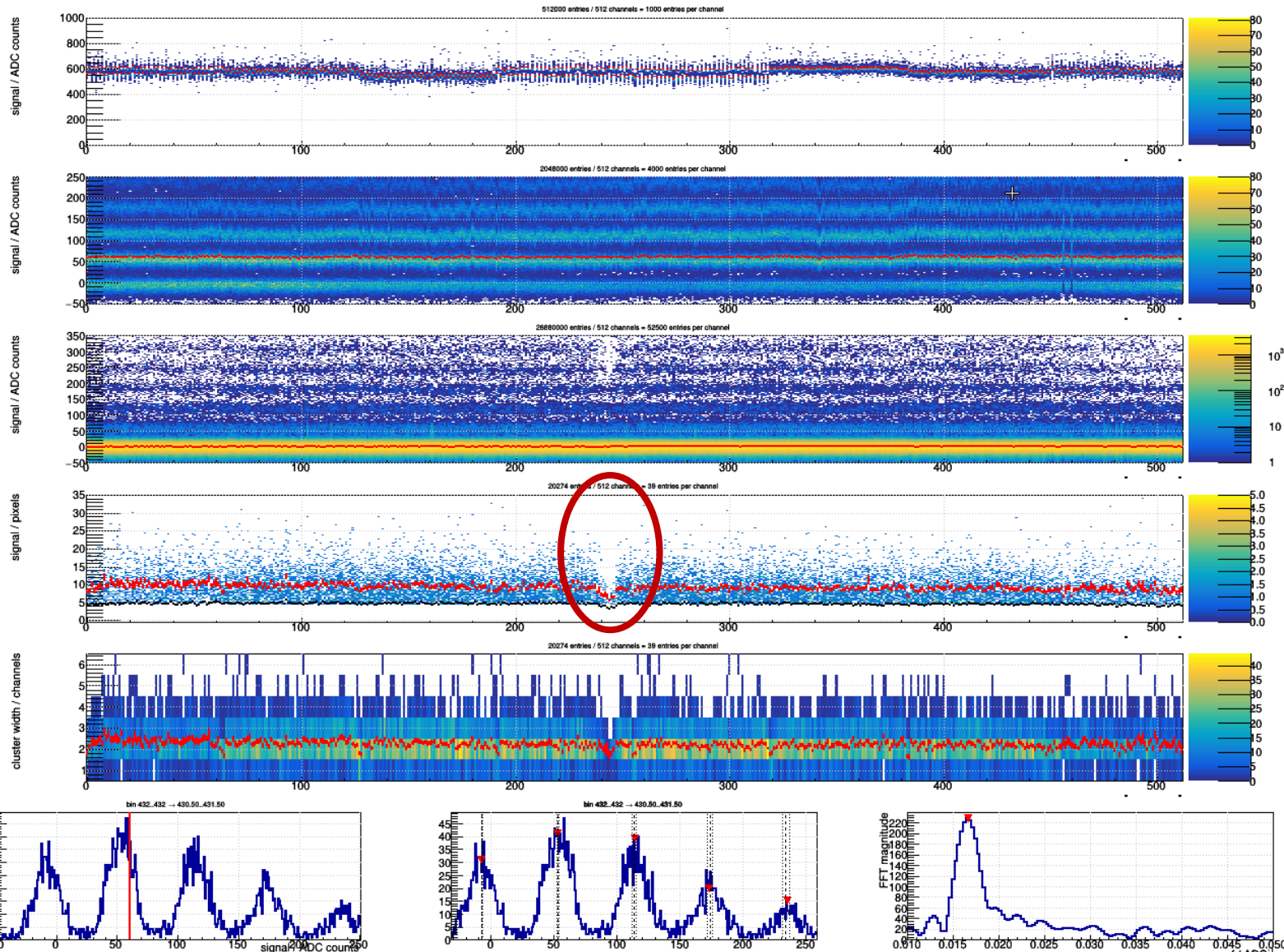
Plexiglas absorber to cut off MIPs



# Quality assurance of SciFi assemblies



An example of a damaged assembly





# Thank you!



## «LHCb gets ready for a SciFi upgrade»

*by Kate Kahle (Aug 2017)*

Each of the four boxes houses five detector modules. 128 modules will make up the new scintillating fibre (SciFi) tracker, part of the major upgrade of the LHCb detector  
(Image: Christian Joram/ CERN)

<http://home.cern/cern-people/updates/2017/08/lhcb-gets-ready-sci-fi-upgrade>