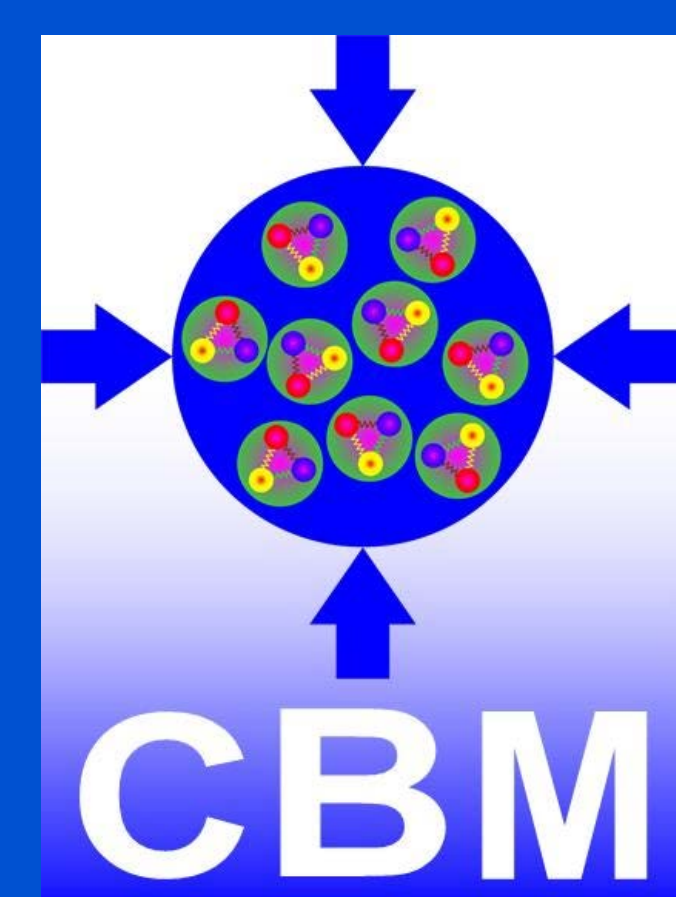
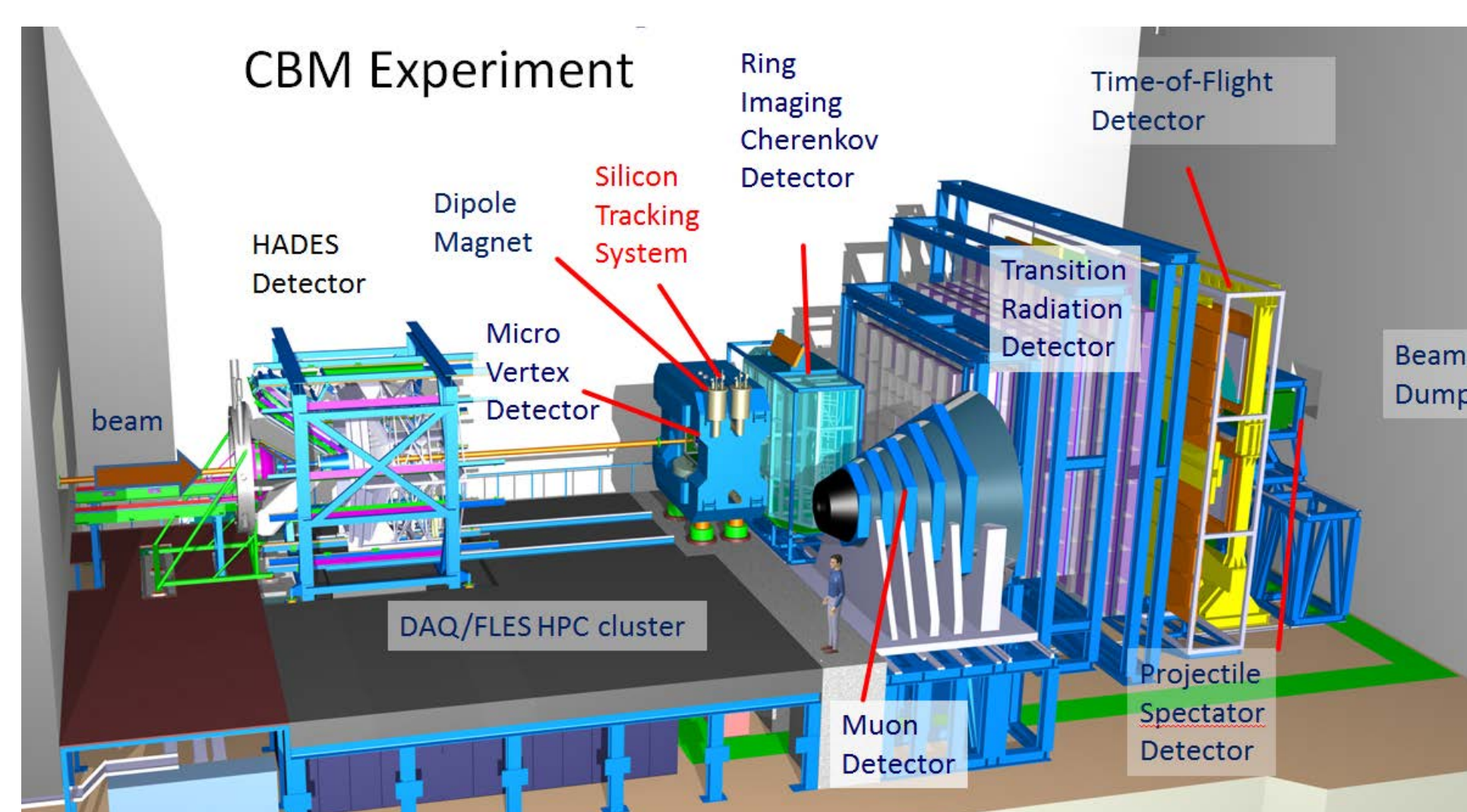


The workflow of module assembly for the CBM Silicon Tracking System

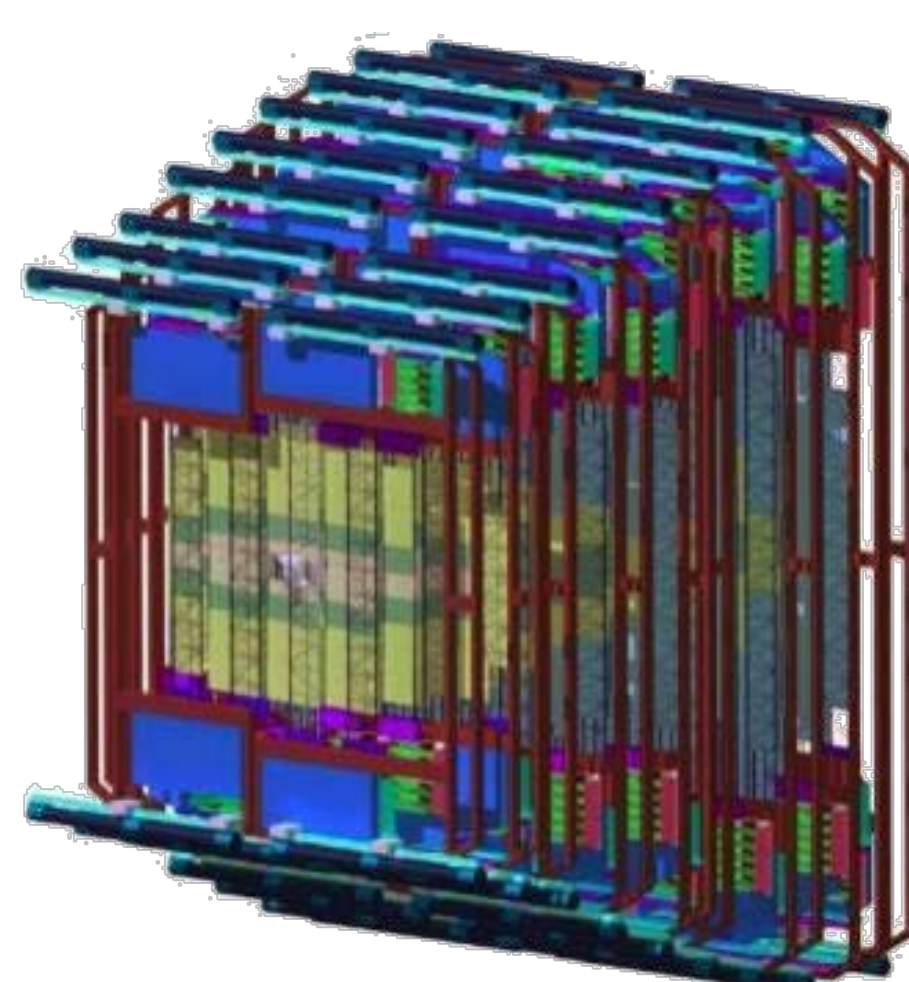
Carmen Simons, Daniel Soyk and Robert Visinka, GSI, for the CBM Collaboration



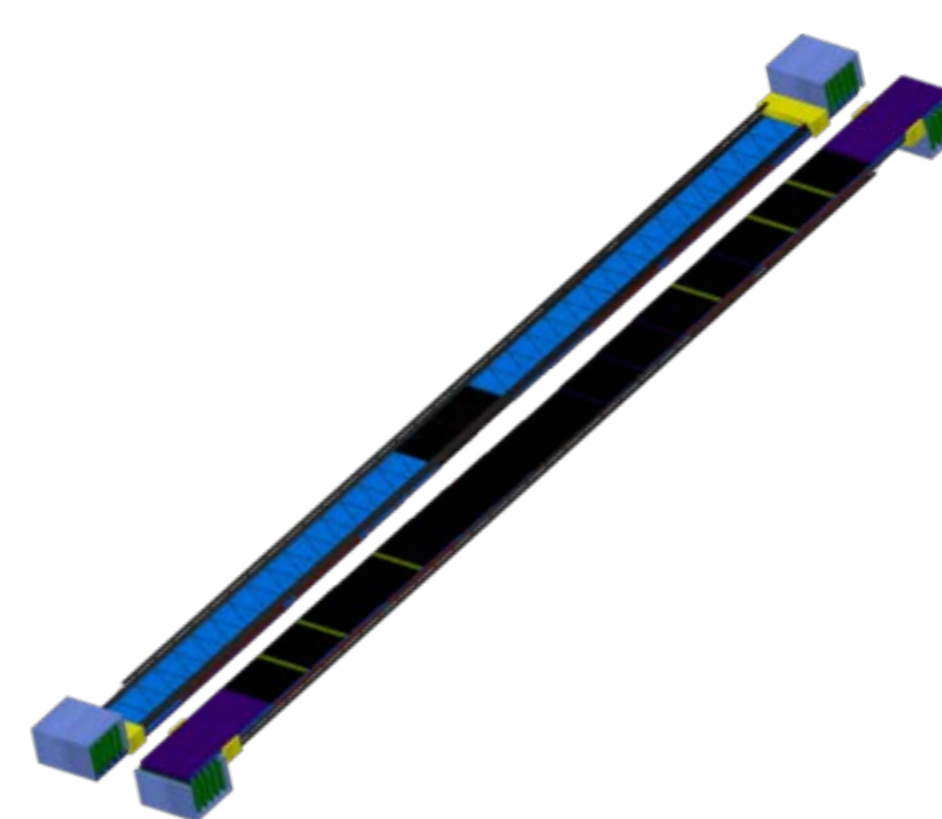
The STS Detector of the CBM Experiment @ FAIR



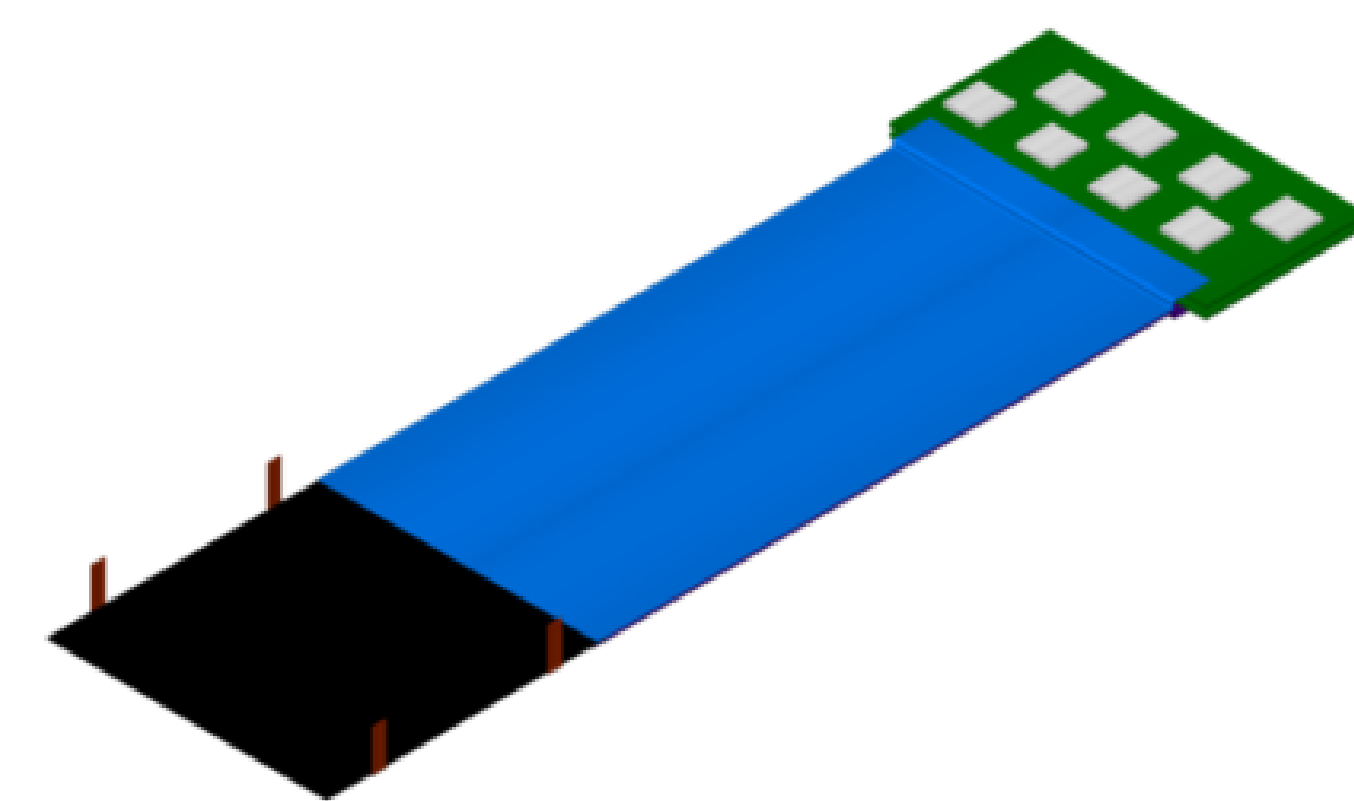
STS with 8 tracking stations



106 detector ladders



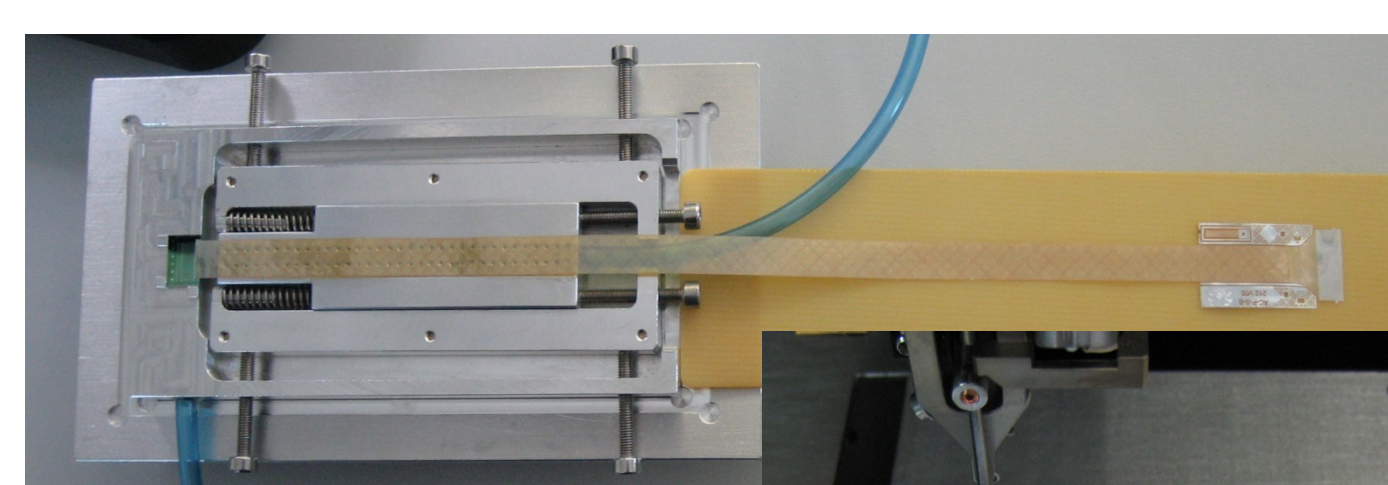
896 detector modules



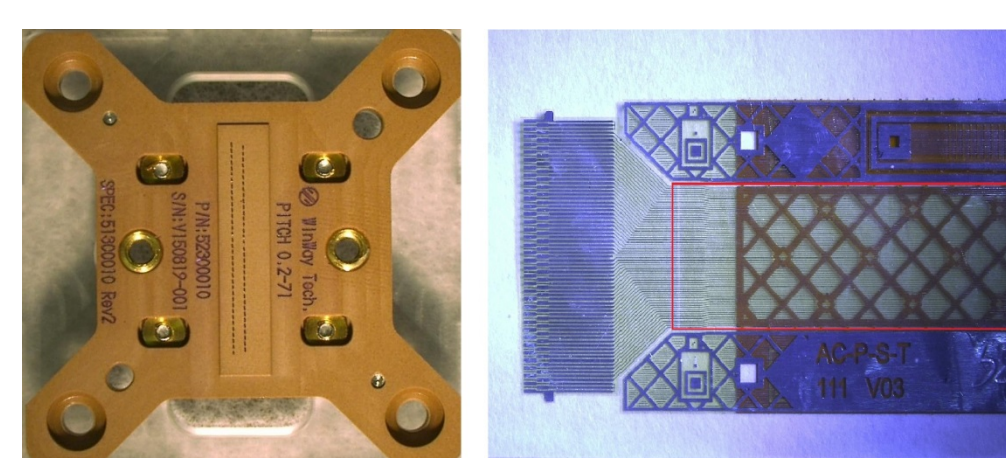
The Silicon Tracking System (STS) is the core detector that provides track reconstruction and momentum determination of charged particles from beam-target interactions. It will consist of 8 tracking stations that are built from different types of basic functional modules which are mounted on carbon fiber ladders.

STS module assembly

Step 1: TAB-bonding of the microcables to the STS-XYTER-ASIC (first and second layer), quality measurement and protection with Globtop

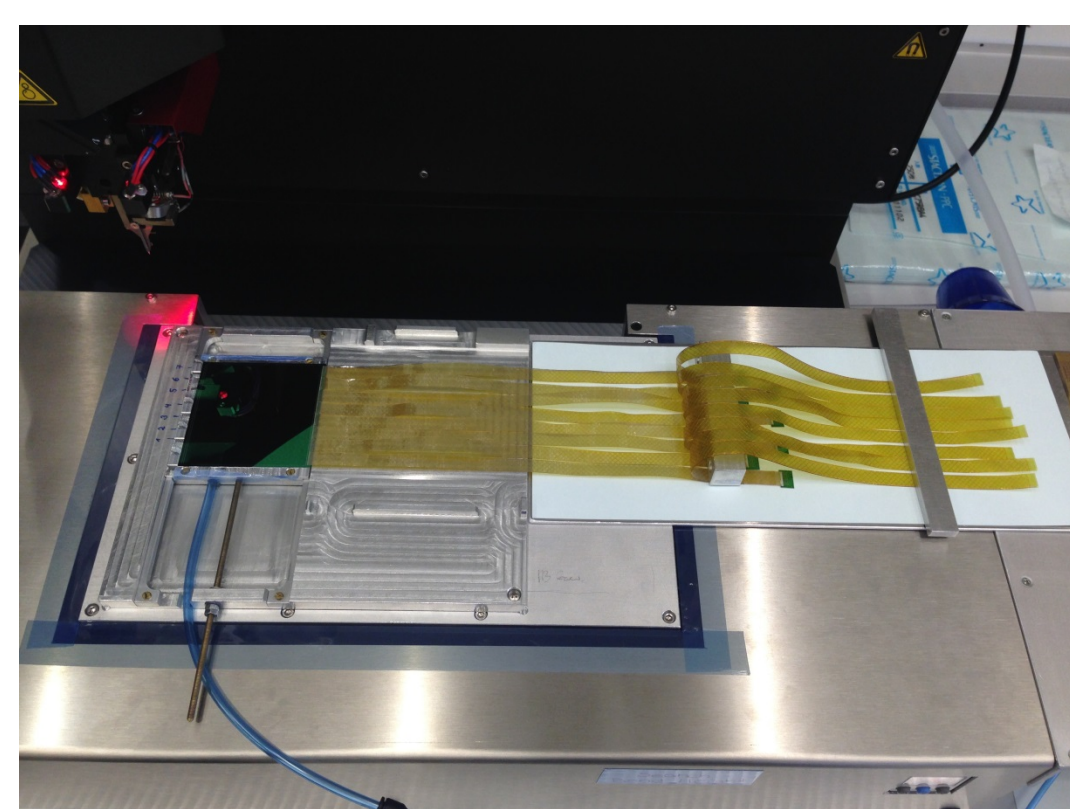


TAB-bonding

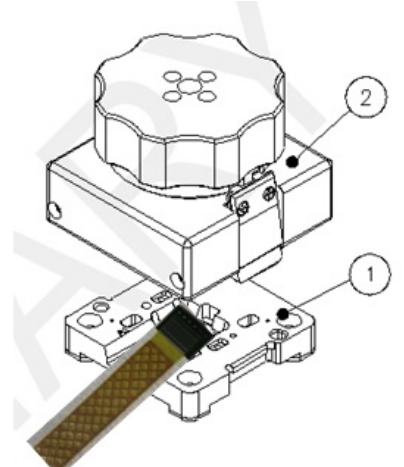


connectivity test with Pogo pin socket

Step 2: TAB-bonding of the microcables to the silicon sensor (first and second layer), quality measurement and protection with Globtop



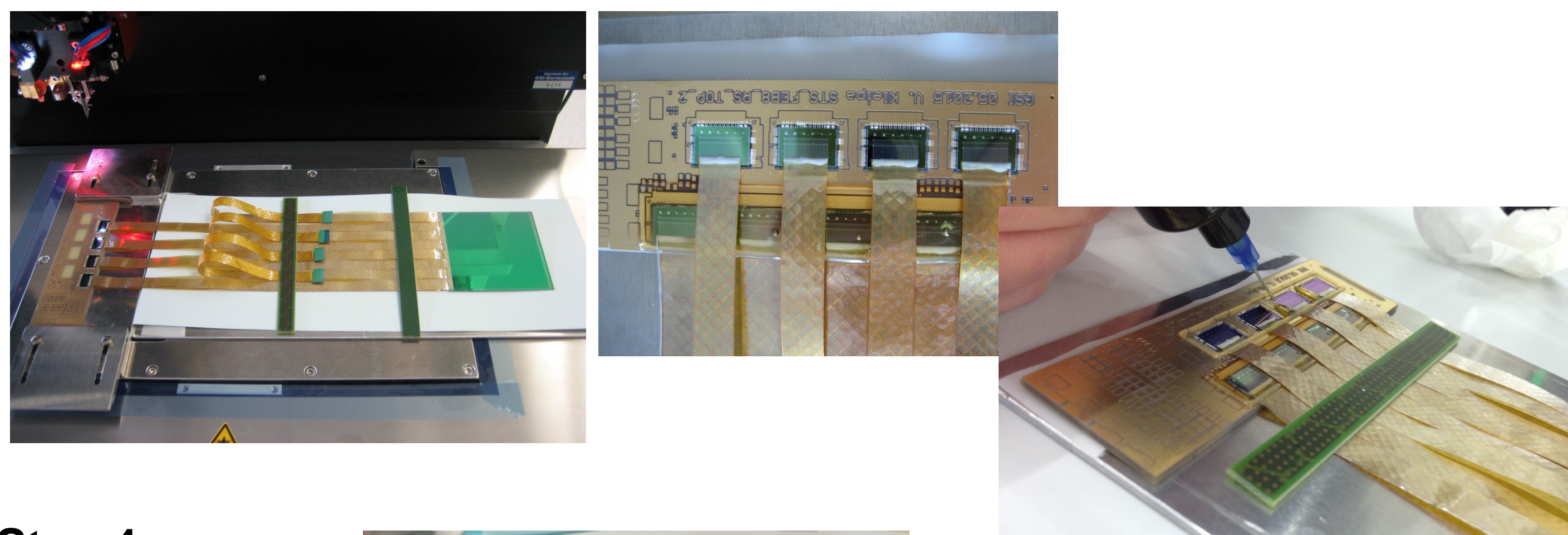
aligning and TAB-bonding



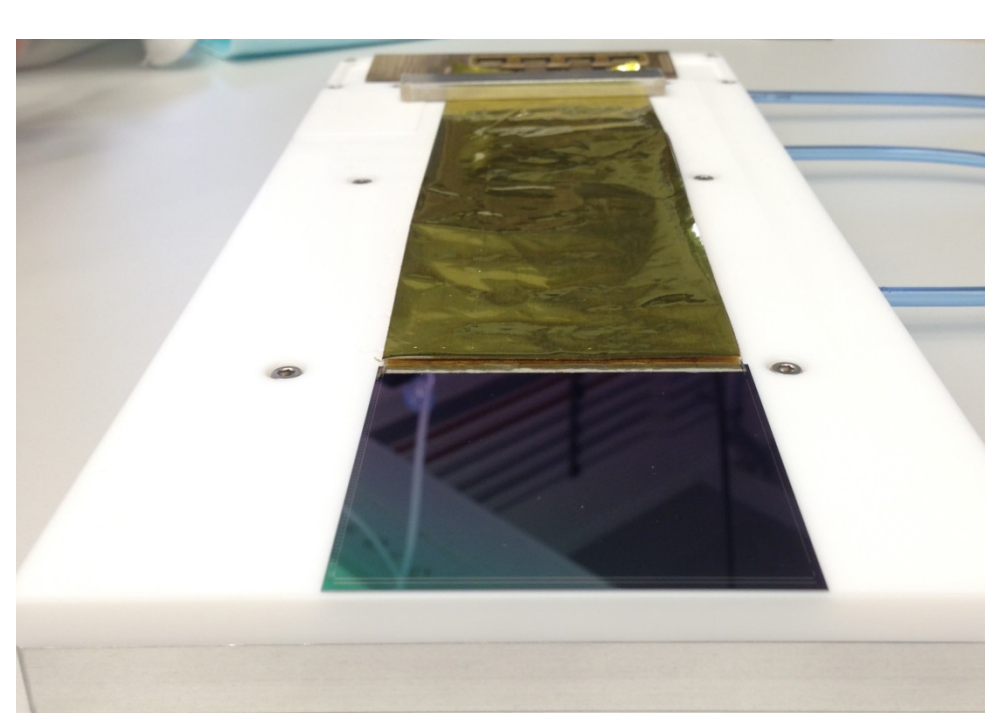
connectivity tests will be performed with a Pogo pin socket that puts the STS-ASIC in minimal operation



Step 3: die- and wirebonding of 4 STS-XYTER-ASIC's to the first row of the PCB, quality measurement and protection with Globtop; then procedure is repeated for the second row



Step 4: glueing of shielding layers and spacers



This semi-module then has to be turned to the other side of the sensor and the steps have to be repeated!

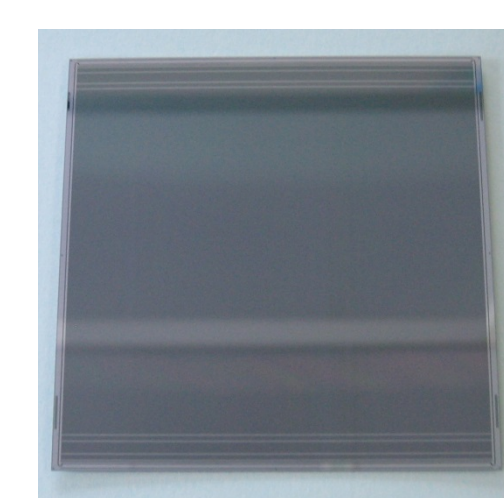
The developed fixtures fix the microcables with vacuum and allow alignment in x-, y- and theta-direction before bonding.

STS module



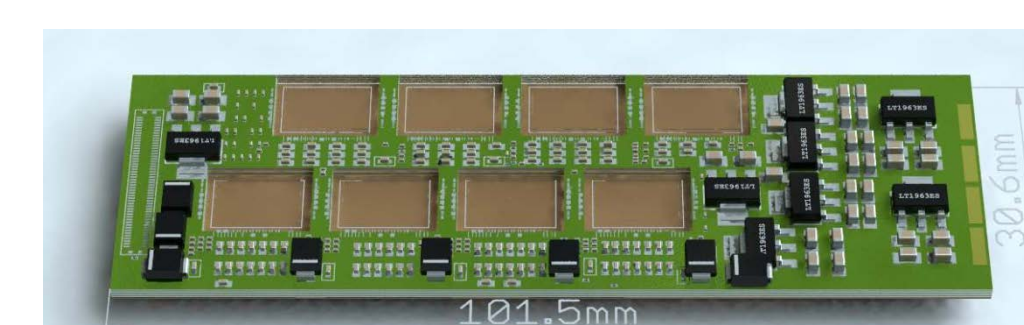
A STS-module consists of a double-sided silicon microstrip sensor that is connected via microcables to two front-end-electronics PCB's.

Assembly material



double-sided silicon microstrip sensors with 1024 stripes (4 different sizes: 22, 42, 62 and 124 mm length with a width of 62 mm)

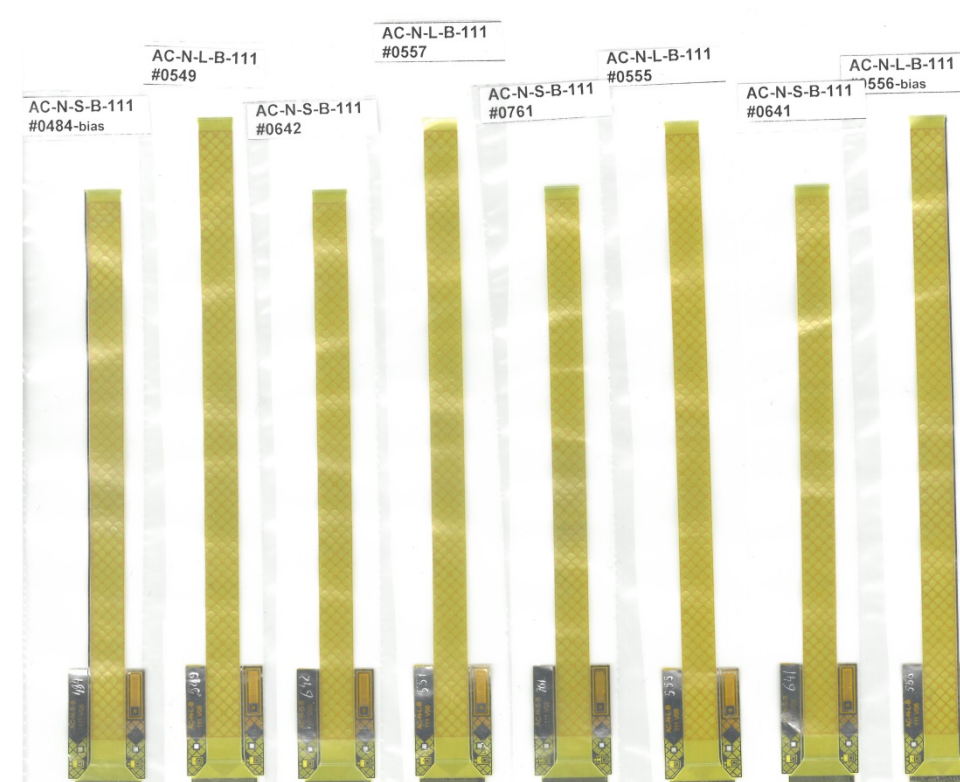
all in all 32 microcables (4 sets of 8 cables)



2 STS-XYTER-PCB's



16 STS-XYTER-ASIC's

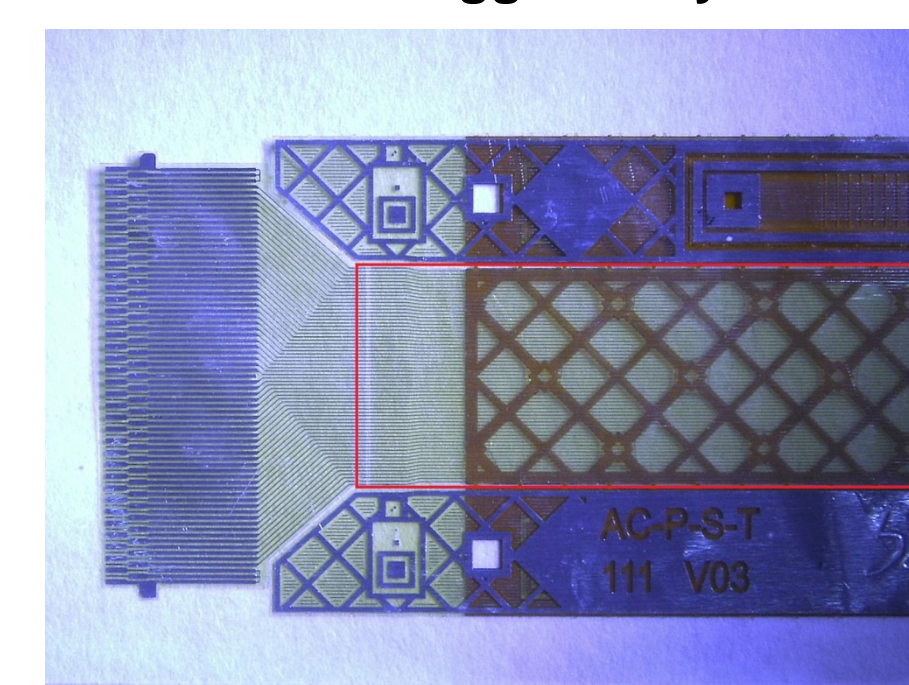


2 shielding layers and spacers

microcables:



The 24 μm thick microcables (10 μm polyimide + 14 μm Aluminum), each with 64 aluminum traces of about 40 μm width, have to be connected on one side to an STS-XYTER-ASIC and on the other side to the P- or N-side of the sensor in two staggered layers with TAB-bonding.



testfan of the microcable with bonding area, will be cut after connectivity tests



aluminum traces, TAB-bonded to bond pads of a silicon sensor

Cable stack

Additional spacers are placed between two signal layers to reduce the capacitance contributions from the adjacent connecting layers. Shielding layers reduce the noise level and prevent shorting between the stacks of cables.

