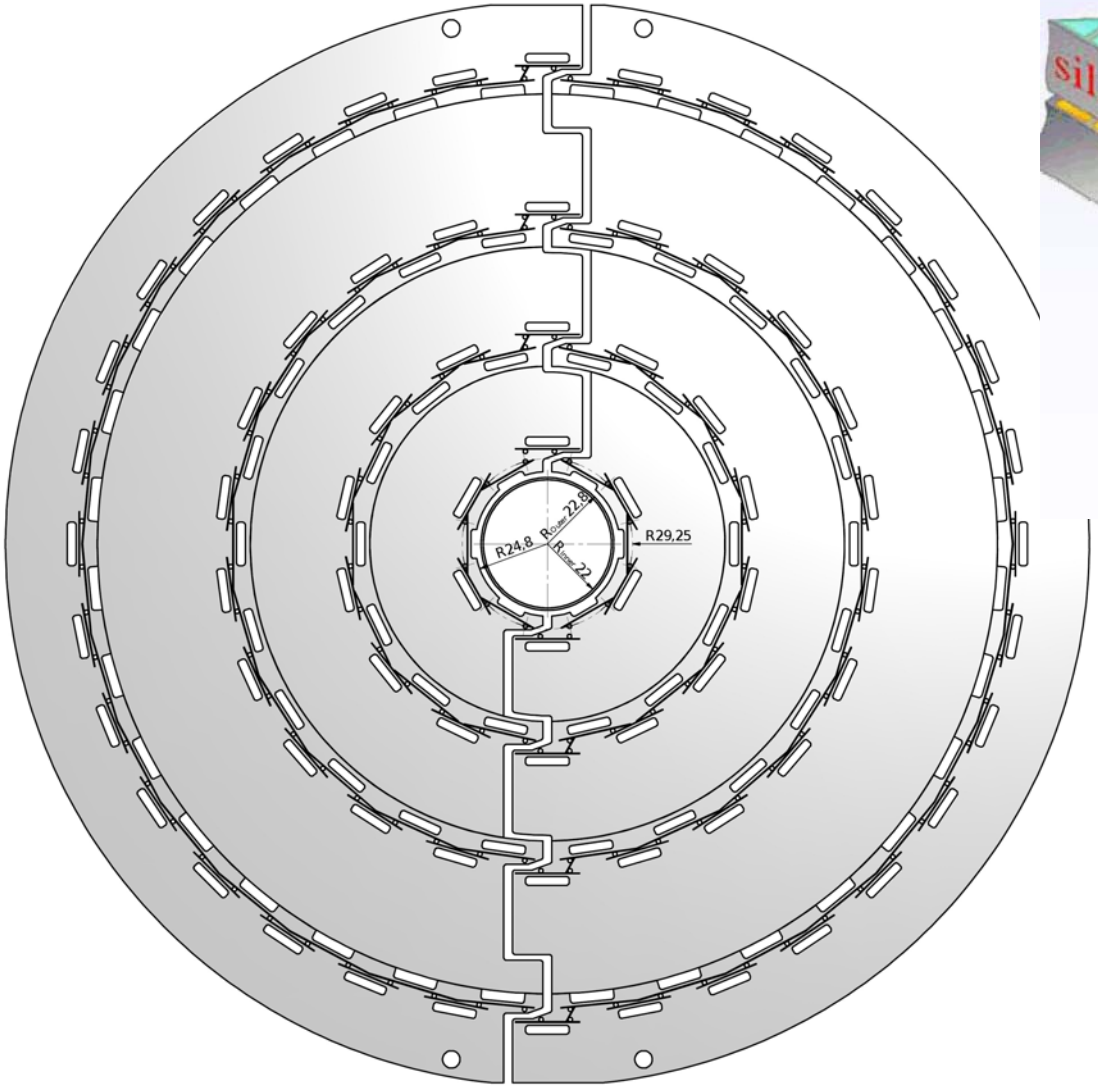
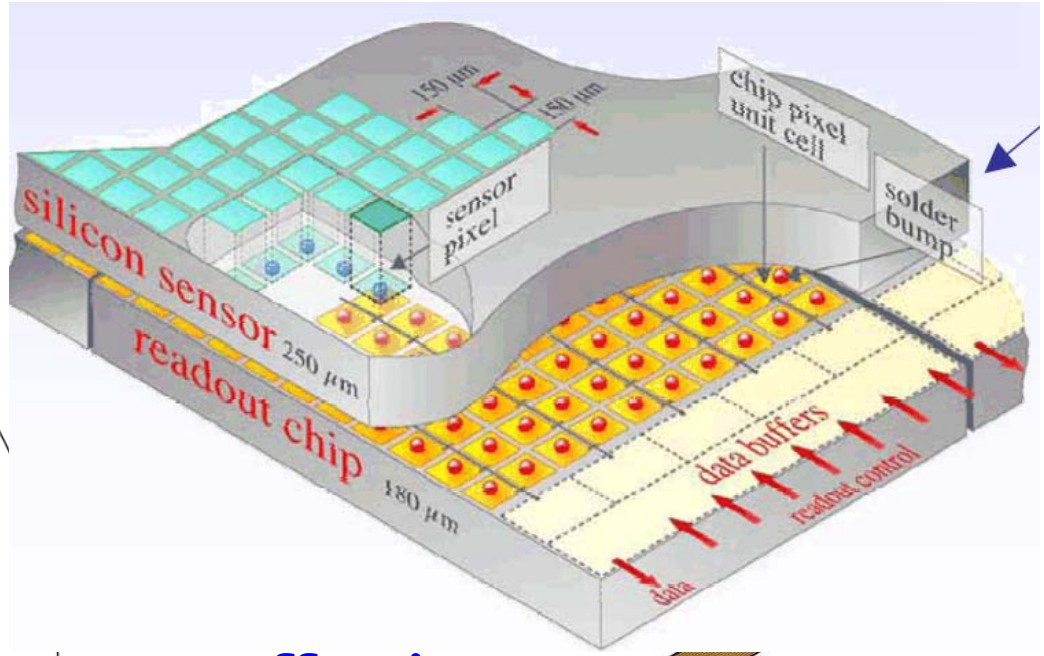
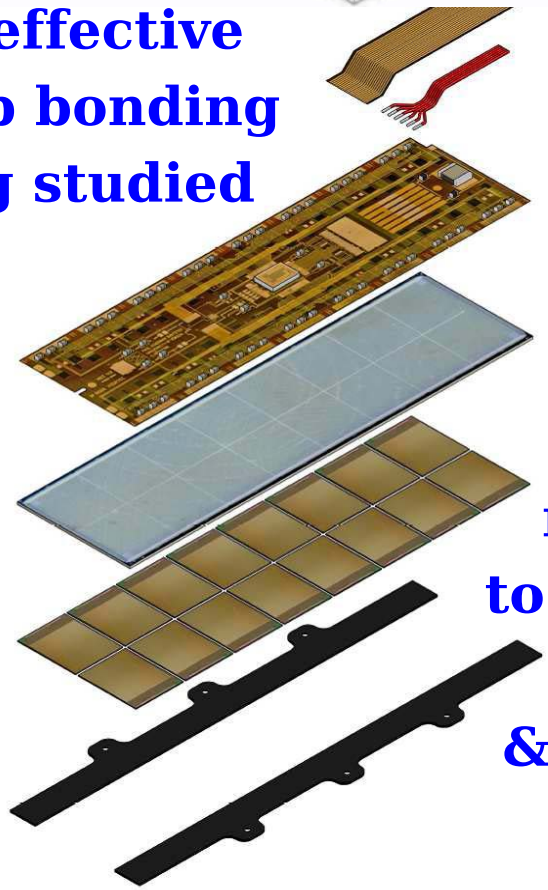
Barrel pixel upgrade





cost effective bump bonding being studied



4 layers (now 3)
inner layer at 30 mm (now 44)
less material in tracking volume
new readout chip for $2 \cdot 10^{34}/cm^2/s$

350 modules to be built at DESY & Uni HH by 2016

Pixel Upgrade Timeline

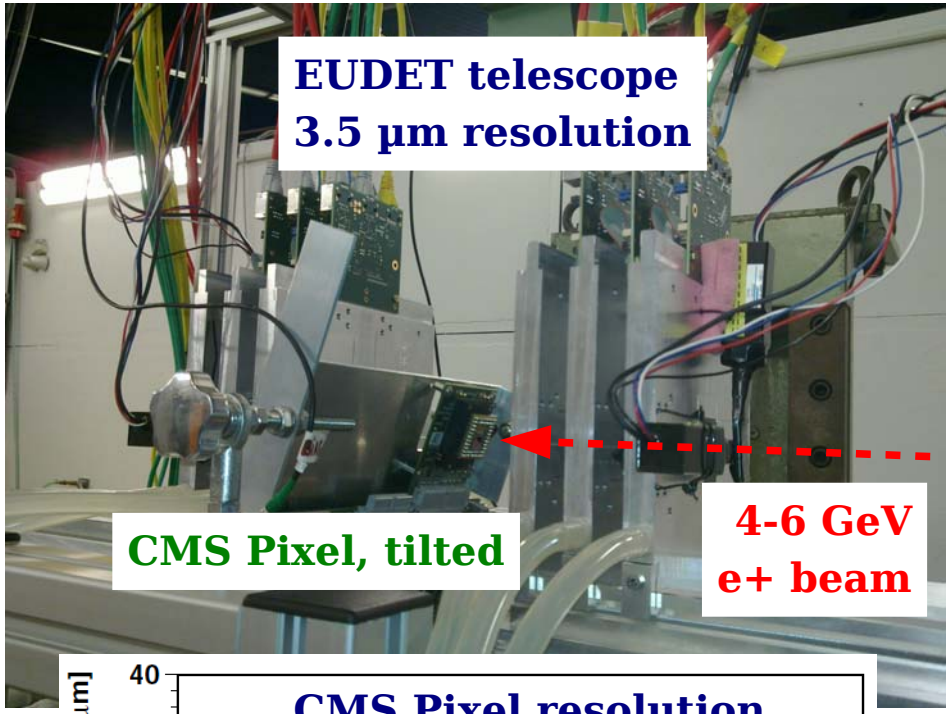
This years activities :

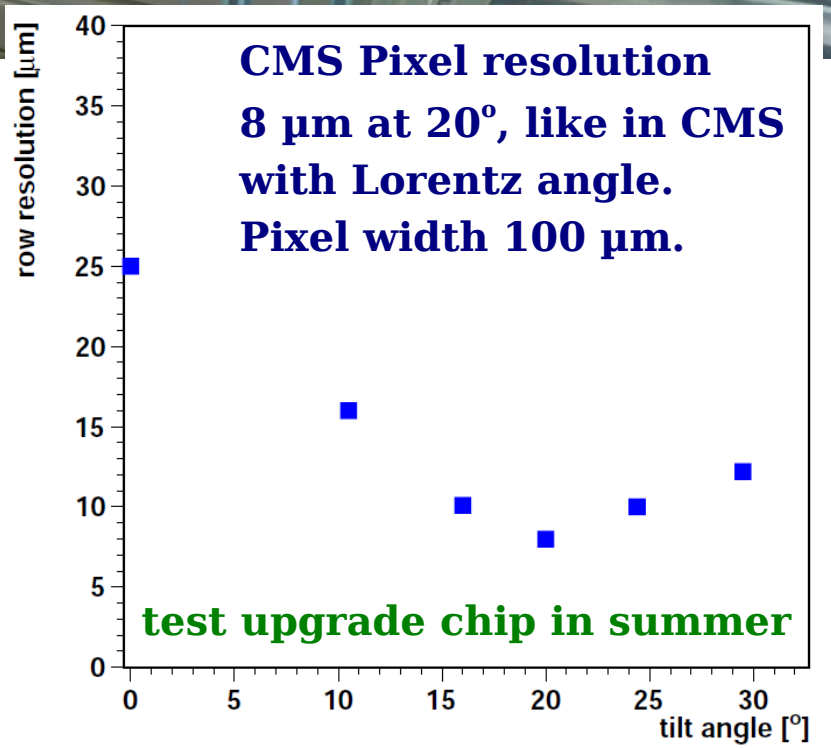
- Establish production procedures (gluing, wire bonding)
- test and calibration procedures (x-ray, cold-box, testbeam)
- Purchase wire bonder (in collaboration with DESY-ATLAS)
- Bump bonding technique to be decided until mid 2012
  - to be purchased and installed by end 2012
- Participating in ROC pre-series tests starting May 2012

Next steps :

- Module pre-series production by mid 2013
  - production site qualification
- Full module production and calibration mid 2013 – mid 2015
- Outer layer assembly and test mid 2015
- Full system test at CERN 2016
- Installation in CMS in extended technical stop 2016/17

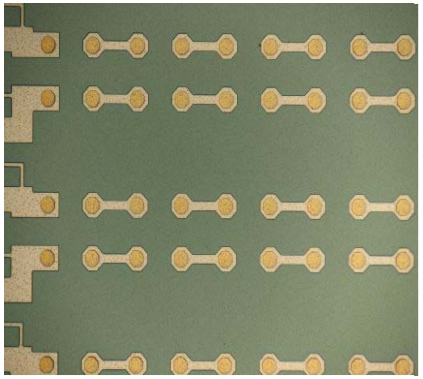
Pixel in test beam





Bump bonding

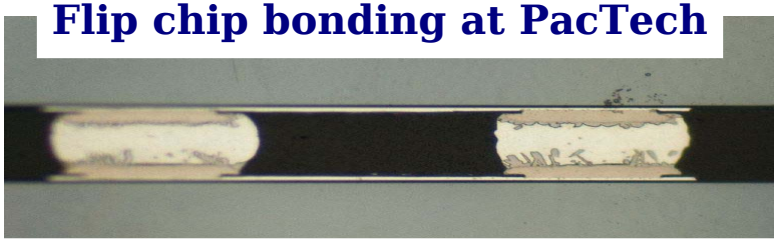
with industry: PacTech



Our contact chain test structures made at CIS Erfurt with Ni-Au under-bump metal from PacTch

30 µm SnAg solder balls placed at PacTech.

Flip chip bonding at PacTech



our picture after cut, grind, polish

Full sensor processed (66k bumps), under evaluation.
Machine order imminent.