THE SLIM CONNECTOR REQUIREMENT FOR HGTD
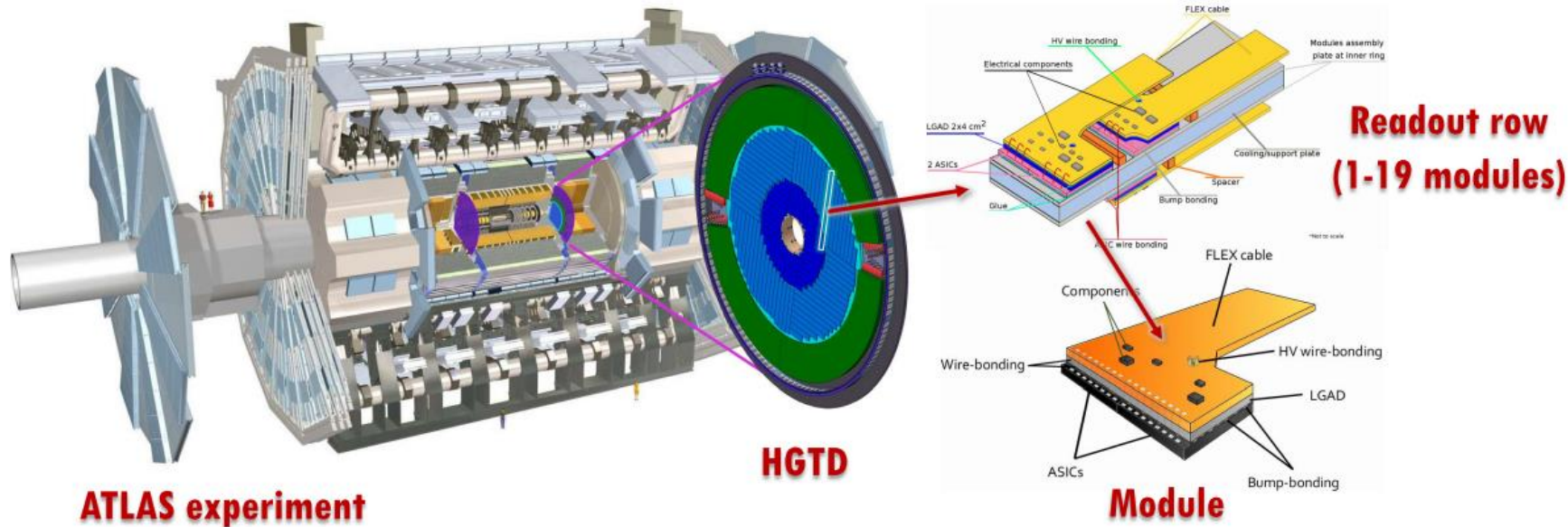
Jie Zhang

zhj@ihep.ac.cn

BACKGROUND

High-Granularity Timing Detector (HGTD)

ATLAS experiment

HGTD

Readout row (1-19 modules)

Module

The High Granularity Timing Detector for the High Luminosity ATLAS Phase II upgrade, will provide precise timing information (30 ps per track) at CERN LHC. Placed in the endcap regions, the detector active area consists of 8000 modules (detector basic unit) placed in the so-called redout rows.

Module (2x4 cm2): Low Gain Avalanche Detector (LGAD) + 2 ASICs + Flexible Printed Circuit (Flex cable)

THE SLIM CONNECTOR REQUIREMENT

- Limited by the space, the height of connector should be as thin as possible, about 1~2mm
  - Dimension < 20mm x 10mm

- Contact number > 60
  - Signal wire: about 21 x 2
  - Power Lines: 5
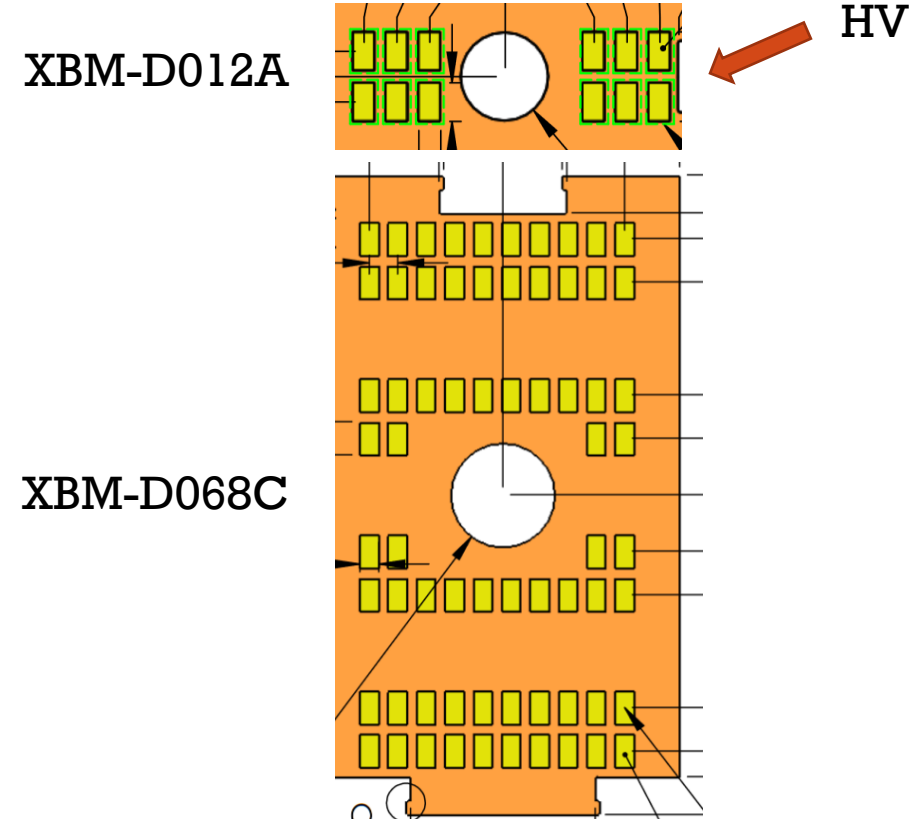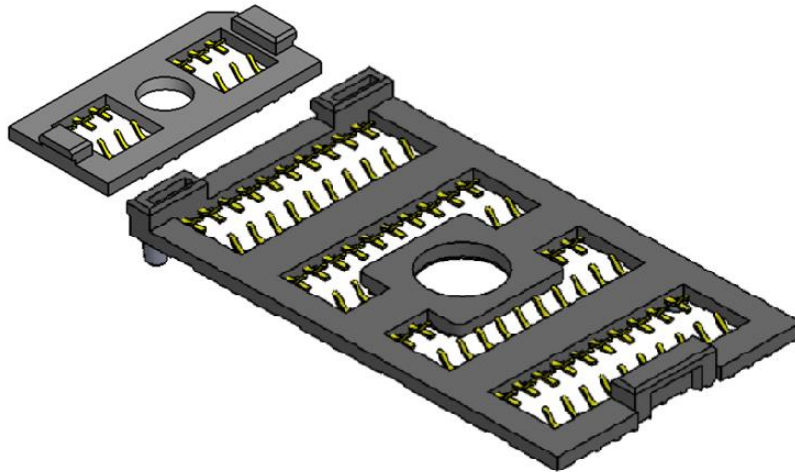   - Safe distance for 1kV

- Data rate (Max): 1.28Gbps

Type and Number of lines

Signal name	Signal type	No. of wires	Comments
High Voltage	Analog power	1	1 kV max, need clearance, current < 1mA
POWER	Analog and digital power	2	1.2V, current < 2A
GROUND	Analog and digital power	2	2 planes, Dedicated layer
Slow control	digital	2 or 4	I2C link
Input clock	digital	4(differential pair)	320 MHz, Fast command e-link
Data out lines	digital	4(differential pair)	2 for lumidata, 2 for time data, 1.28Gbps
ASIC reset	digital	1	
Monitoring	analog	6	Temperature, Vdda, Vddd Monitor
Debugging	digital	2	

3

DESIGN CONCEPT

- XBM-D012A + XBM-D068C
  - Dimension: (13.6+3.6)mm x 7.96mm x 1.334 mm

XBM-D012A

XBM-D068C

HV

TO VERIFY

- Installation steps
- The performance of 1.28Gbps
- Safe distance for 1kV