

# Hands-on Lab: FDSOI pixel detector

Y. Unno (KEK), K. Androsov (EPFL and ETHZ)

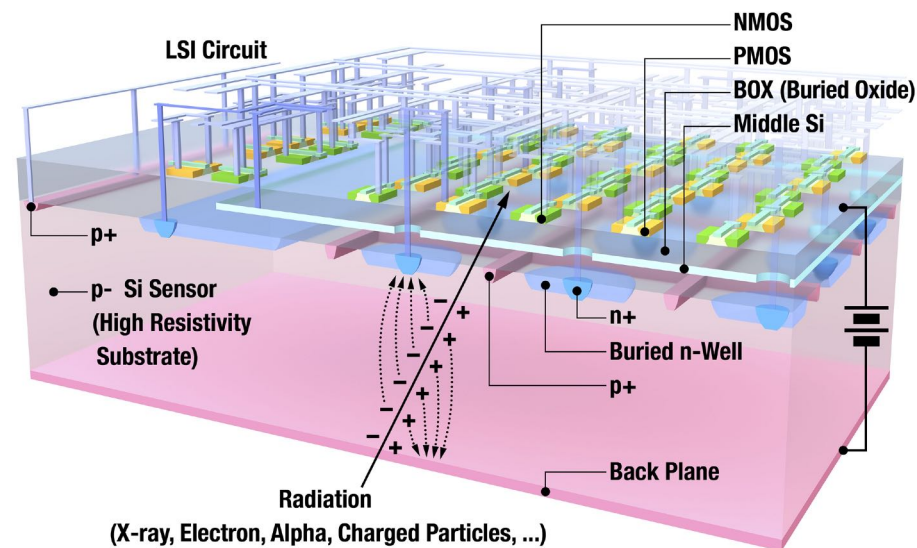
*with help from SOIPIX community*

# FD-SOI Hands-on lab

- The lab session will include:
  - Introduction to Fully-depleted (FD) Silicon-On-Insulator (SOI) detectors
  - Description of the experimental setup
  - Hands-on on data collection and analysis:
    - Detector responses to different laser lights
    - Cosmic ray events collection

# Features of FD-SOI detectors

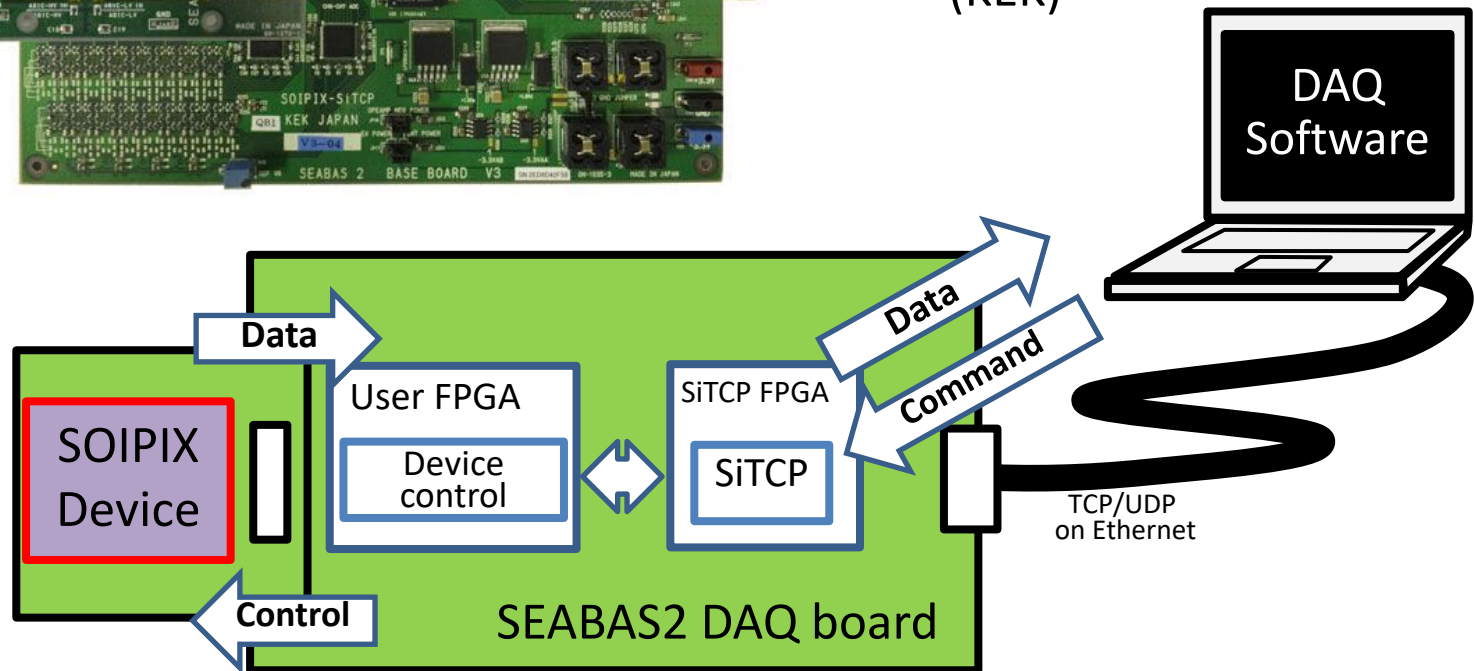
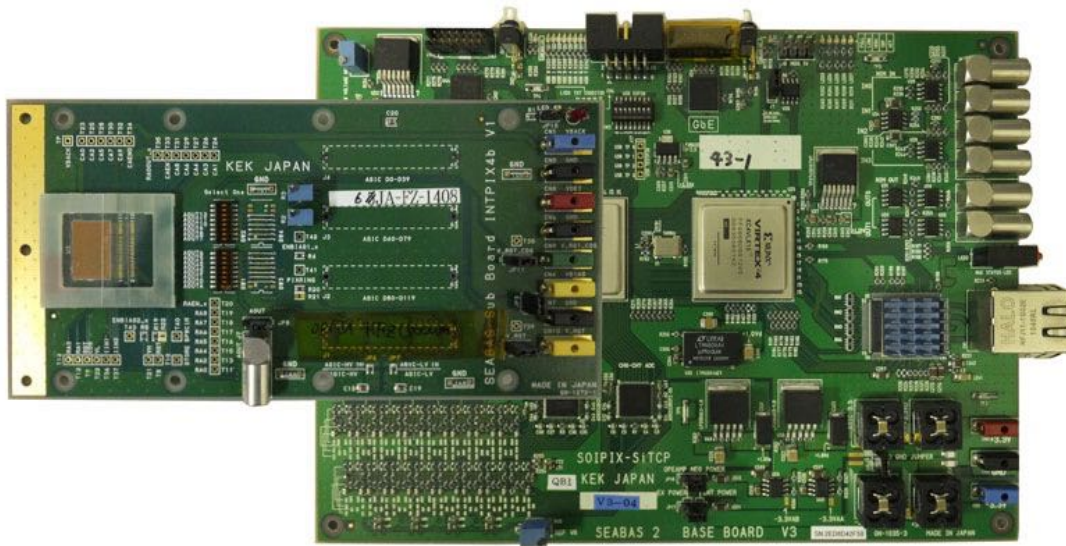
- Monolithic pixel detector (cf. Hybrid pixel)
  - Pixel sensor and (frontend) readout electronics in a single wafer as a one-piece device
- CMOS transistors in a fully-depleted thin layer of "Silicon" of SOI
  - High speed and little latch-up
- Pixel sensors in fully-deplete-able support silicon under the "Insulator" of SOI
- In this lab we will use **INTPIX4** - an integration type pixel detector (of 4th layout)



© Rey. Hori

# FD-SOI pixel detector - Setup

- SOIPIX Device board
  - piggybacking on
- SEABAS DAQ board
  - developed by KEK
- DAQ Software
  - developed by R. Nishimura (KEK)

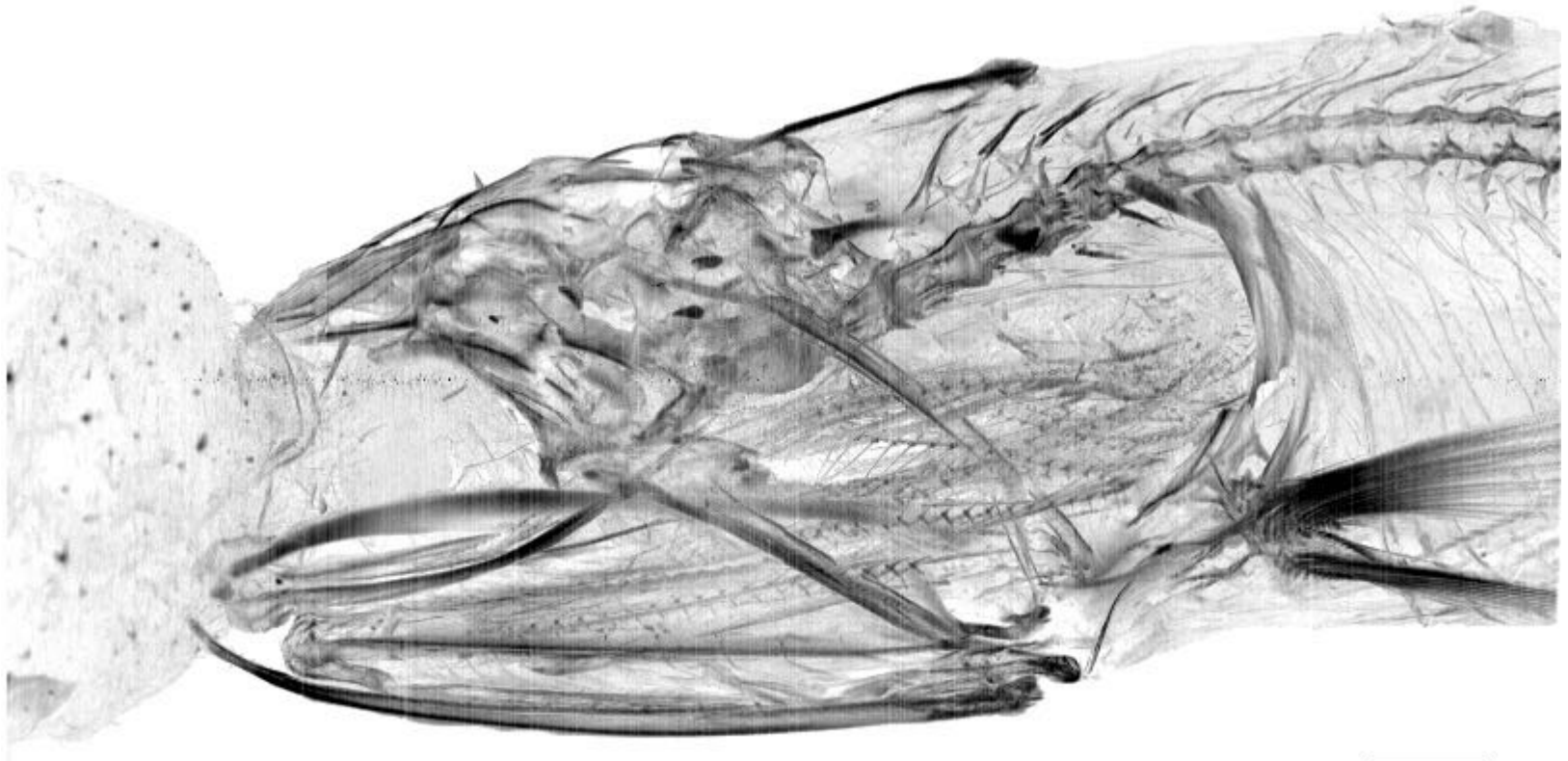


# SOI Device performance example

(3D micro-CT taken by INTPIX4 at PhotonFactory BL-14B)



Sample : Small dried sardine (Niboshi)



By R. Nishimura (KEK)

1 mm

# Space & equipment

- Space
  - One desk (1.8 x 0.9 m<sup>2</sup>)
- Hardware
  - 1x INTPIX4-SEABAS DAQ board (25x15x1 cm<sup>3</sup>)
  - 1x PC
  - 1x Ethernet cable
  - 2x DC power supply cables
  - 2x laser pointers (green and red)
  - 1x 3.6-5.0 V DC power supply (PS)
  - 1x ~100 V DC power supply (PS)
  - 1x AC power cable tap/adaptor (100-240 V) for 2-prong plug (A type)
- Software
  - DAQ software INTPIX4OCV is installed in the PC

