



中国科学院 上海高等研究院

Shanghai Advanced Research Institute, Chinese Academy of Sciences

Progress of SOI Pixel Detectors and Image Sensor

Shanghai Advanced Research Institute

Feb. 1, 2013 @SOI workshop at IHEP

Outline



Overview of SOI Image Sensor
and Pixel Detector

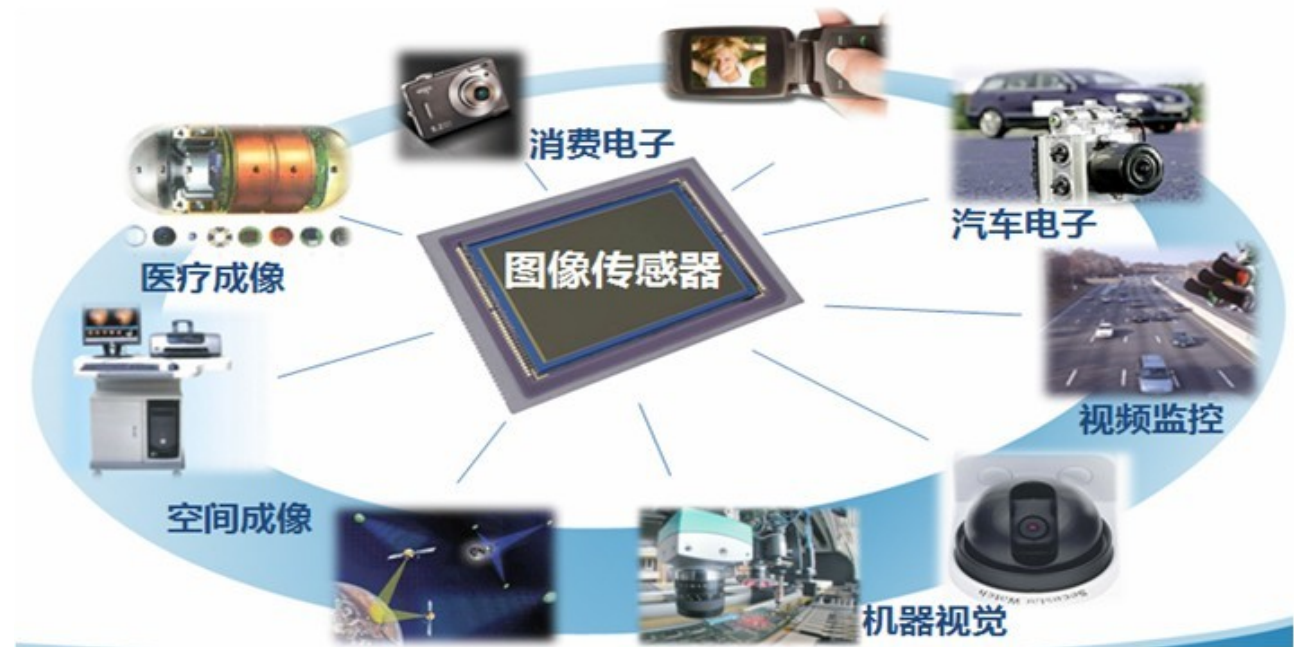
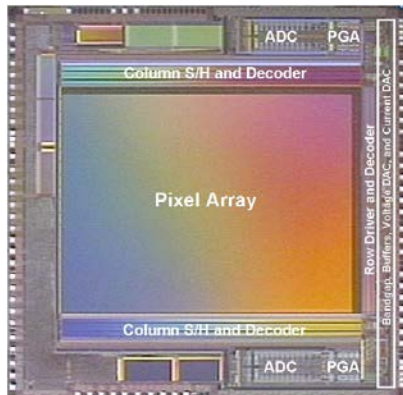


On-Going R&Ds

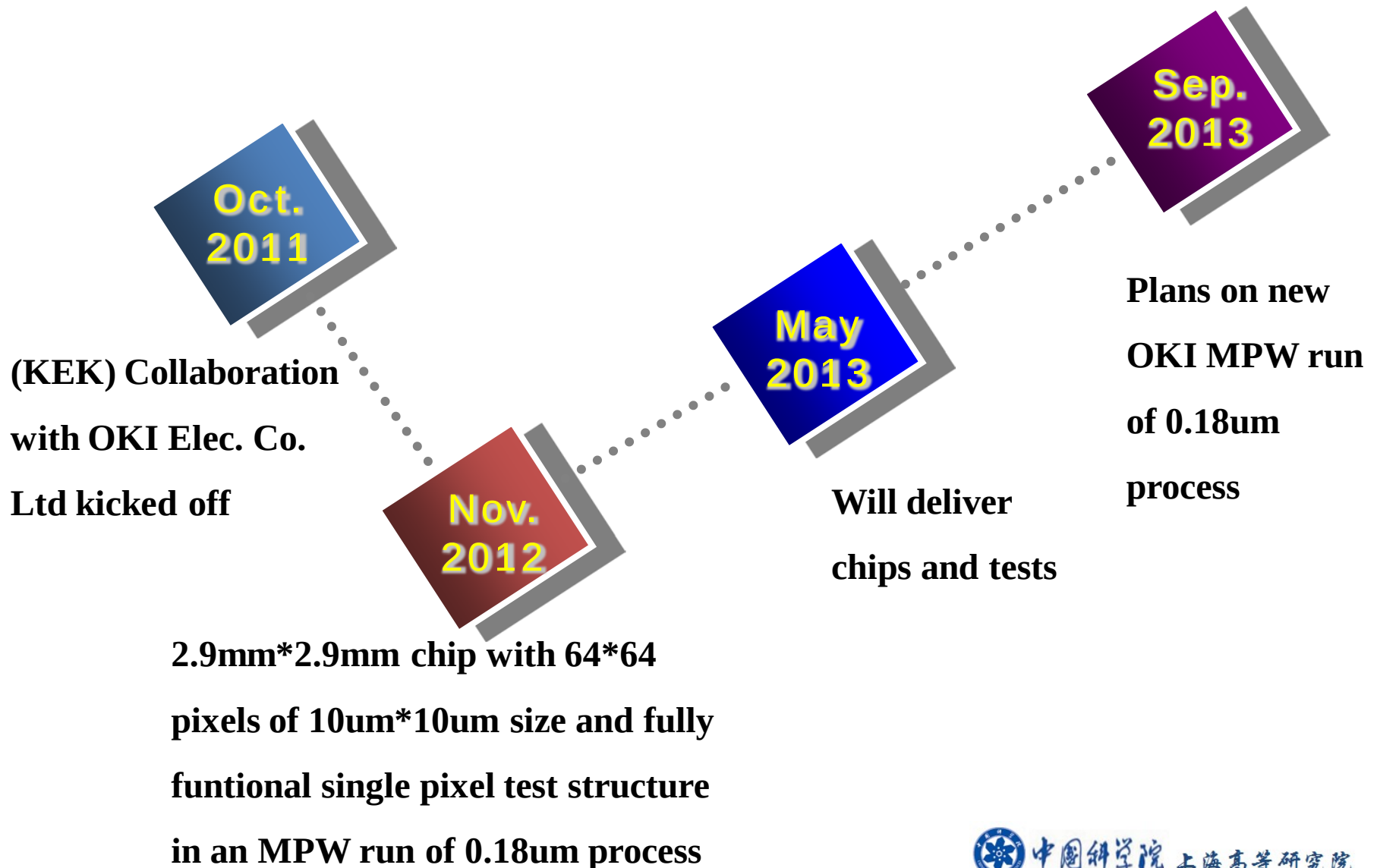


Motivation for development of SOI sensor

CMOS image sensors, functioning as the eye to capture visual information, are widely applied in cameras, cellphones, autos and medical devices.



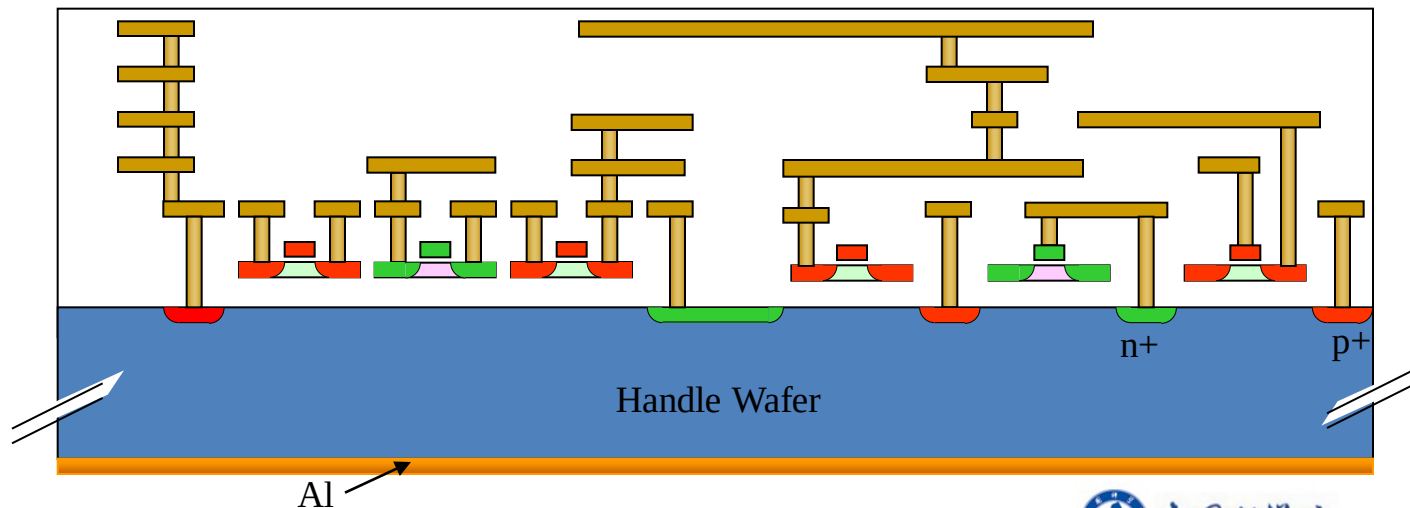
Participation of OKI SOIPIX



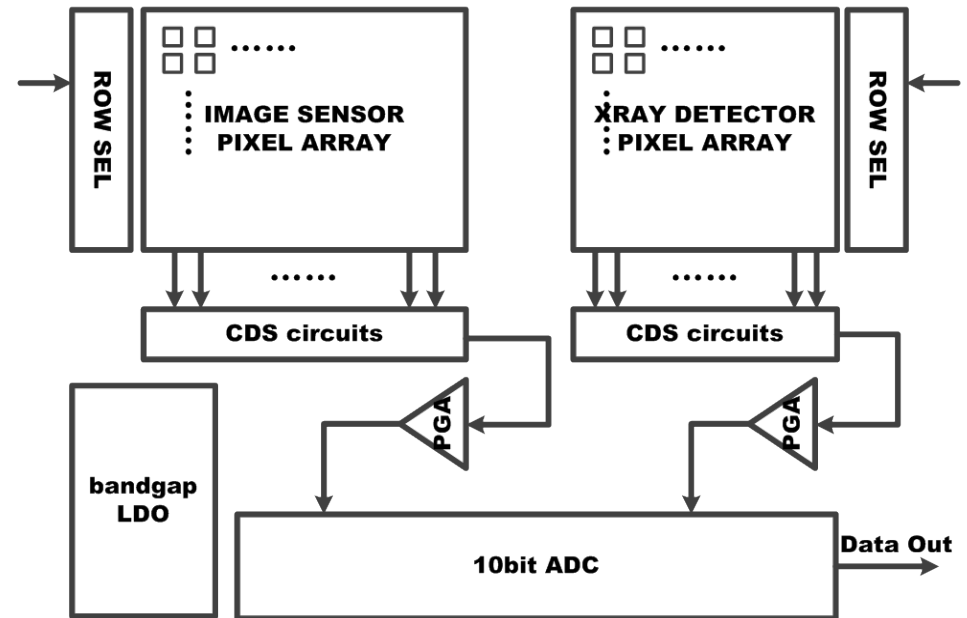
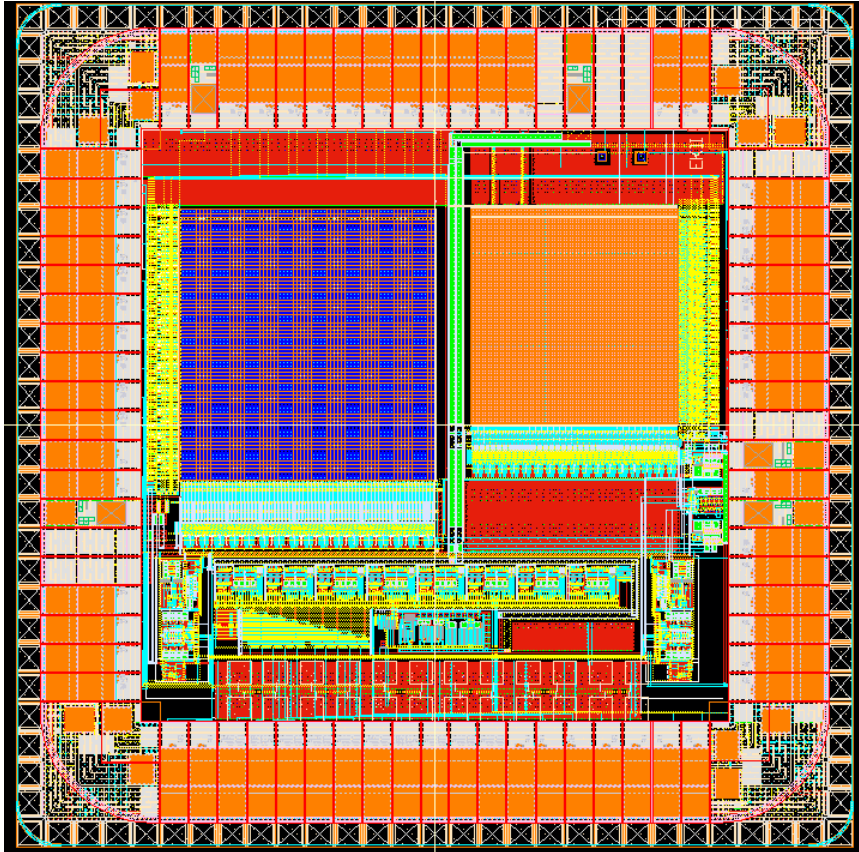
Design Details

Information available from OKI Electric Industry Co. Ltd.

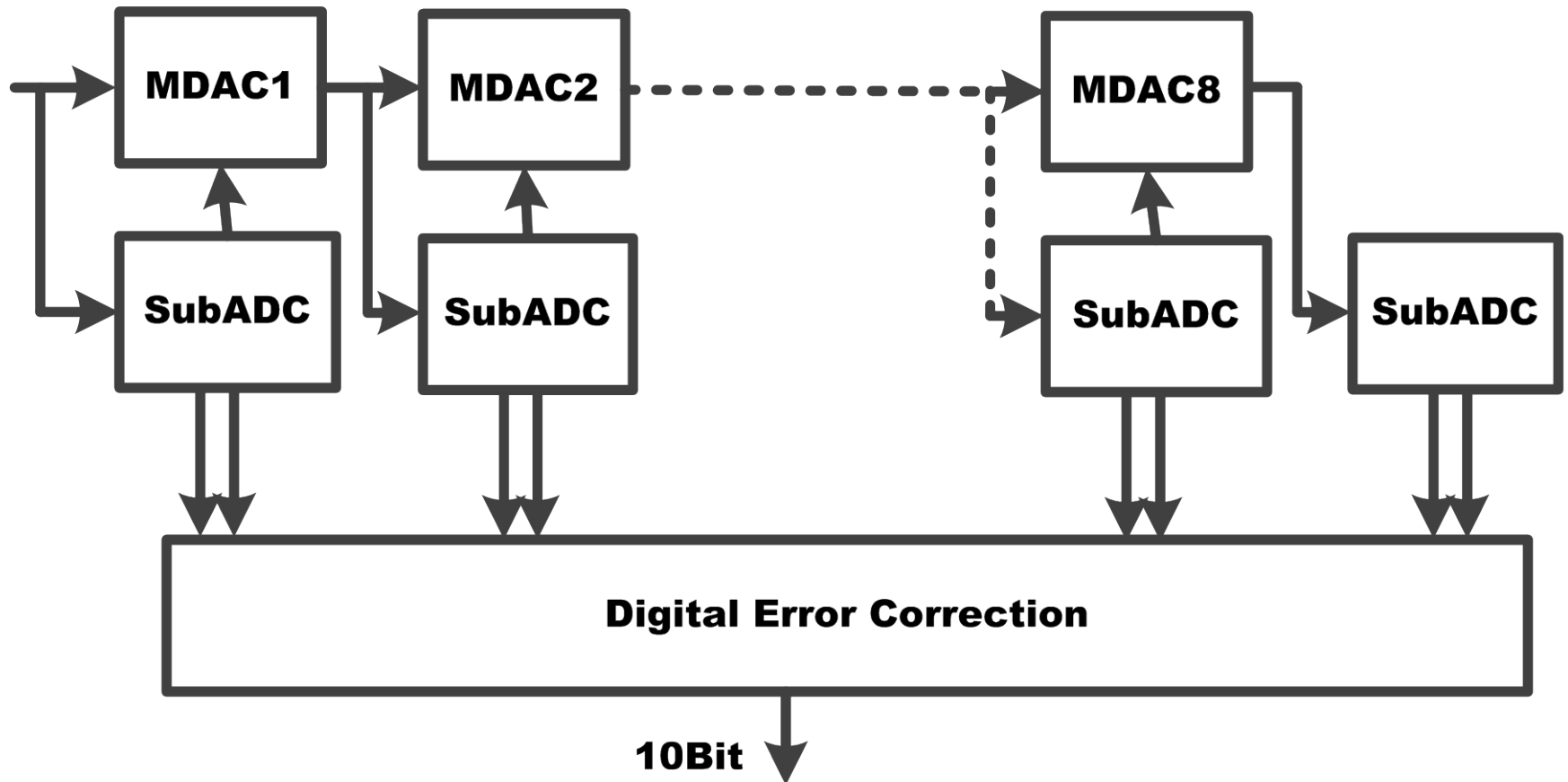
Process	1P5M, MIM, Vcore=1.8 V/3.3V
SOI wafer	Wafer: 150 mm ϕ , Top Si : Cz, $\sim 700 \Omega\text{-cm}$, n-type, $\sim 40 \text{ nm}$ thick Buried Oxide: 200 nm thick, Handle wafer: Cz, $\sim 1\text{k} \Omega\text{-cm}$ (n-type), 650 μm thick (SOITEC)
Backside	Thinned to 350 μm , and sputtered with Al (200 nm).



Chip Overview



ADC



Outline

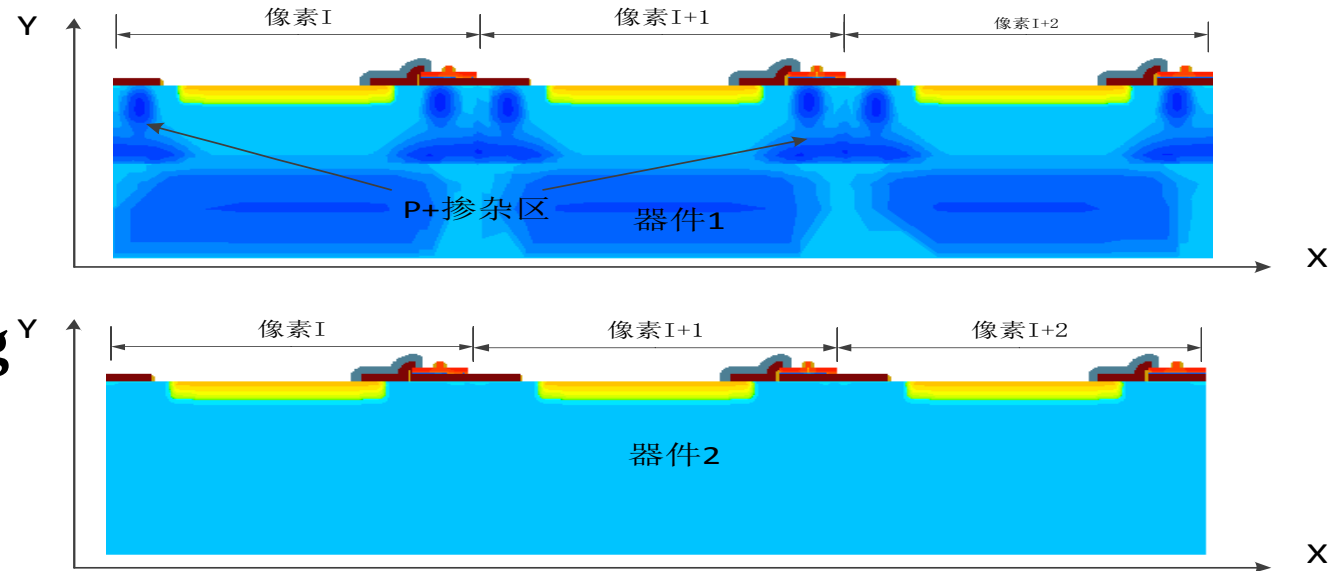
 Overview of SOI Image Sensor
and Pixel Detector



 On-Going R&Ds

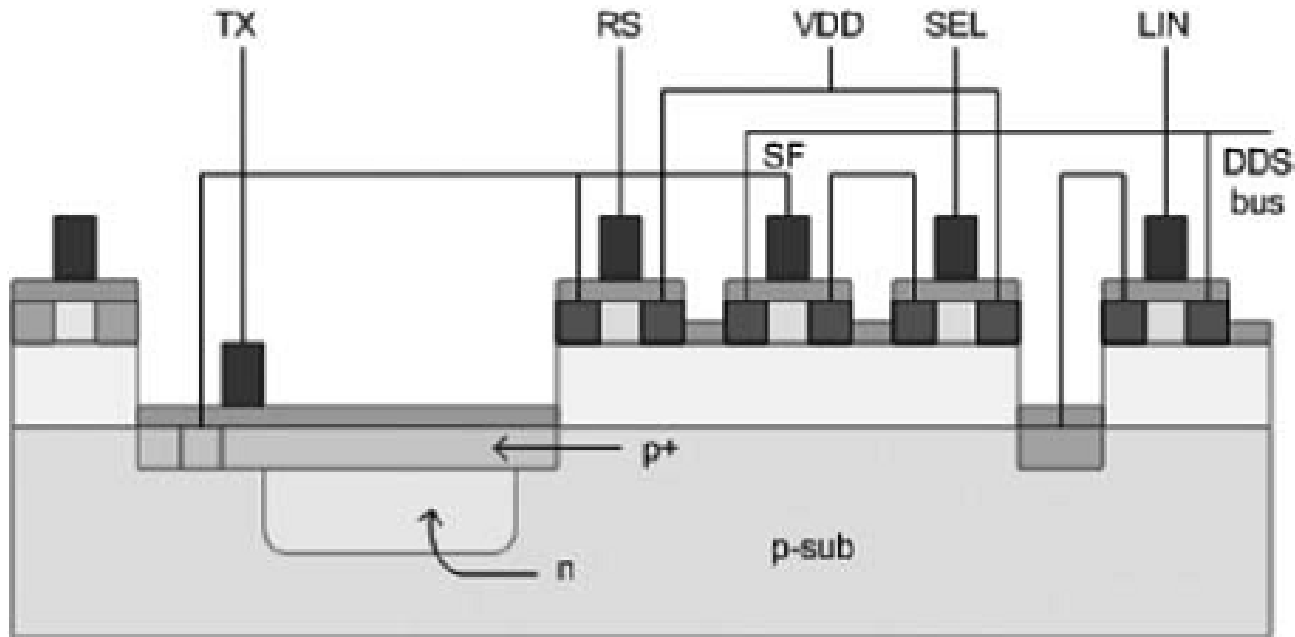
SOI Pixel Modeling

**CMOS Image
Sensor Photo
Diode Isolation
(Anti-Blooming
and Cross-Talk)**



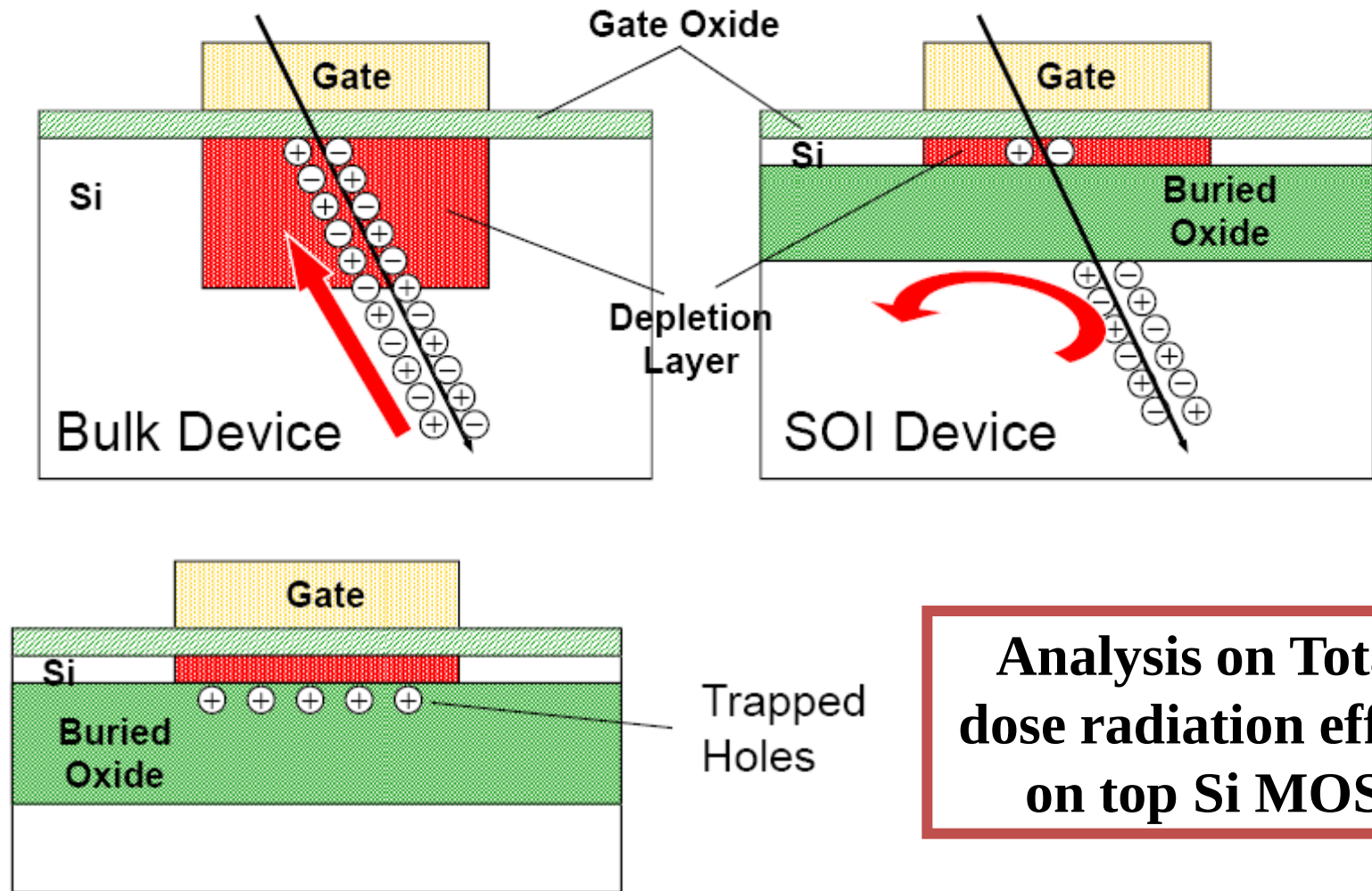
On Handle Wafer there is no isolation structure between PD , Under low bias voltage ($<5V$) , there is electronic pass way between PD which offers blooming and cross-talk ways

4T structure on SOI wafer



32X32 SOI CMOS Image Sensor with Pinned Photodiode on Handle
Wafer Yong -Soo CHO, H. TAKAO¹, K. SAWADA¹, M. ISHIDA¹,
and Sie-Young CHOI

Total Dose Radiation Effect on Top Si MOS



**Analysis on Total
dose radiation effect
on top Si MOS**

THz Imaging

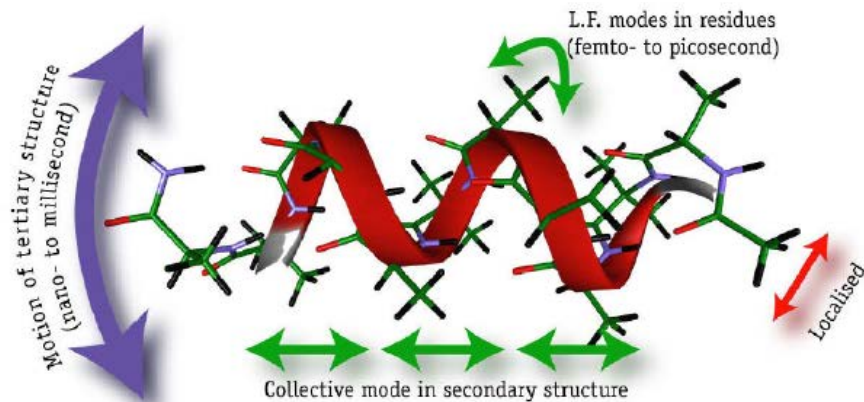
security



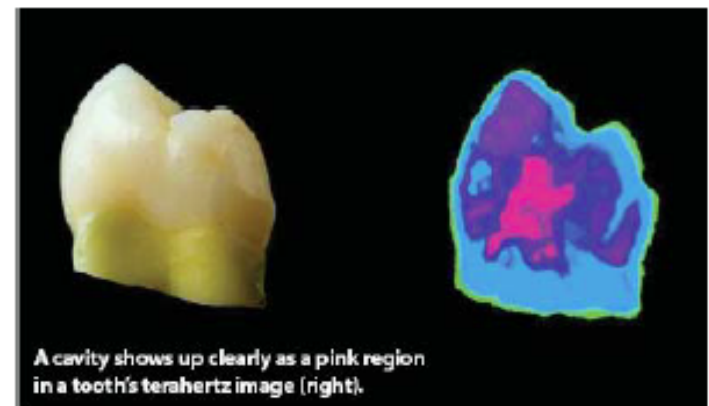
Heroin check



molecular biology

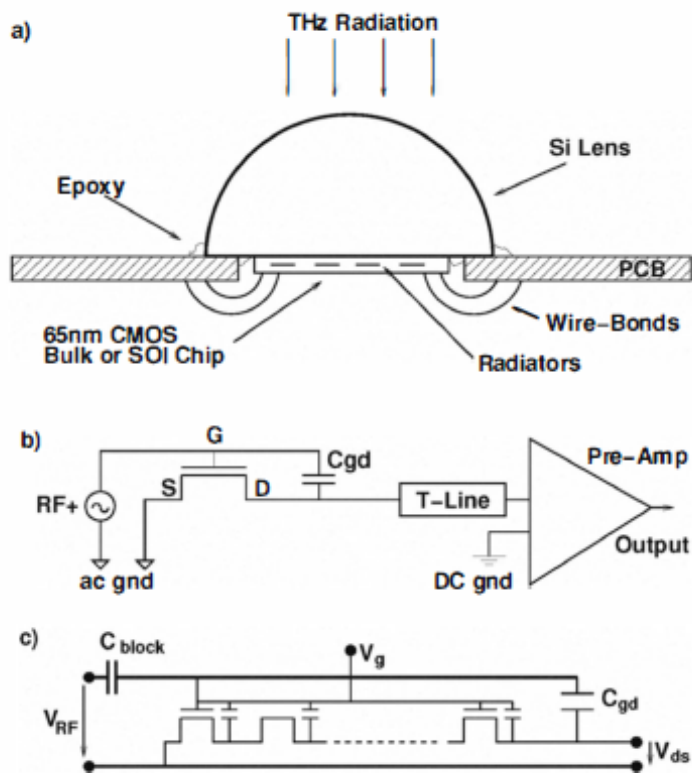


medical examination

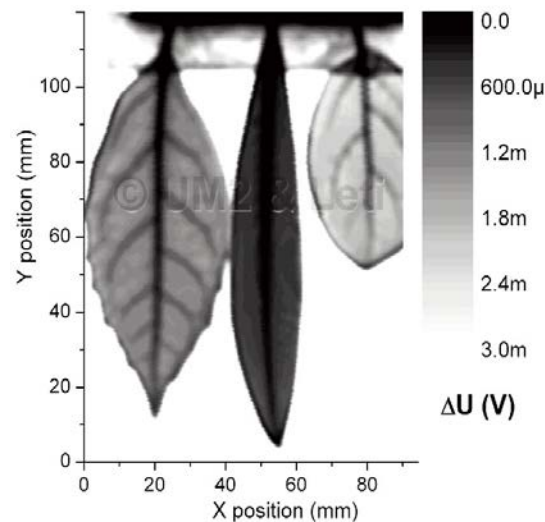


THz Imaging

Pixel structure



Imaging



Thanks!

