LAB Tele Microscopia

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3D EBIC Tomography by FIB

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Outline

- EBIC Embedded in Double Beam system using STEM detection line
- EBIC application in Failure analysis: addressing FIB cut
- EBIC tomography in DB system

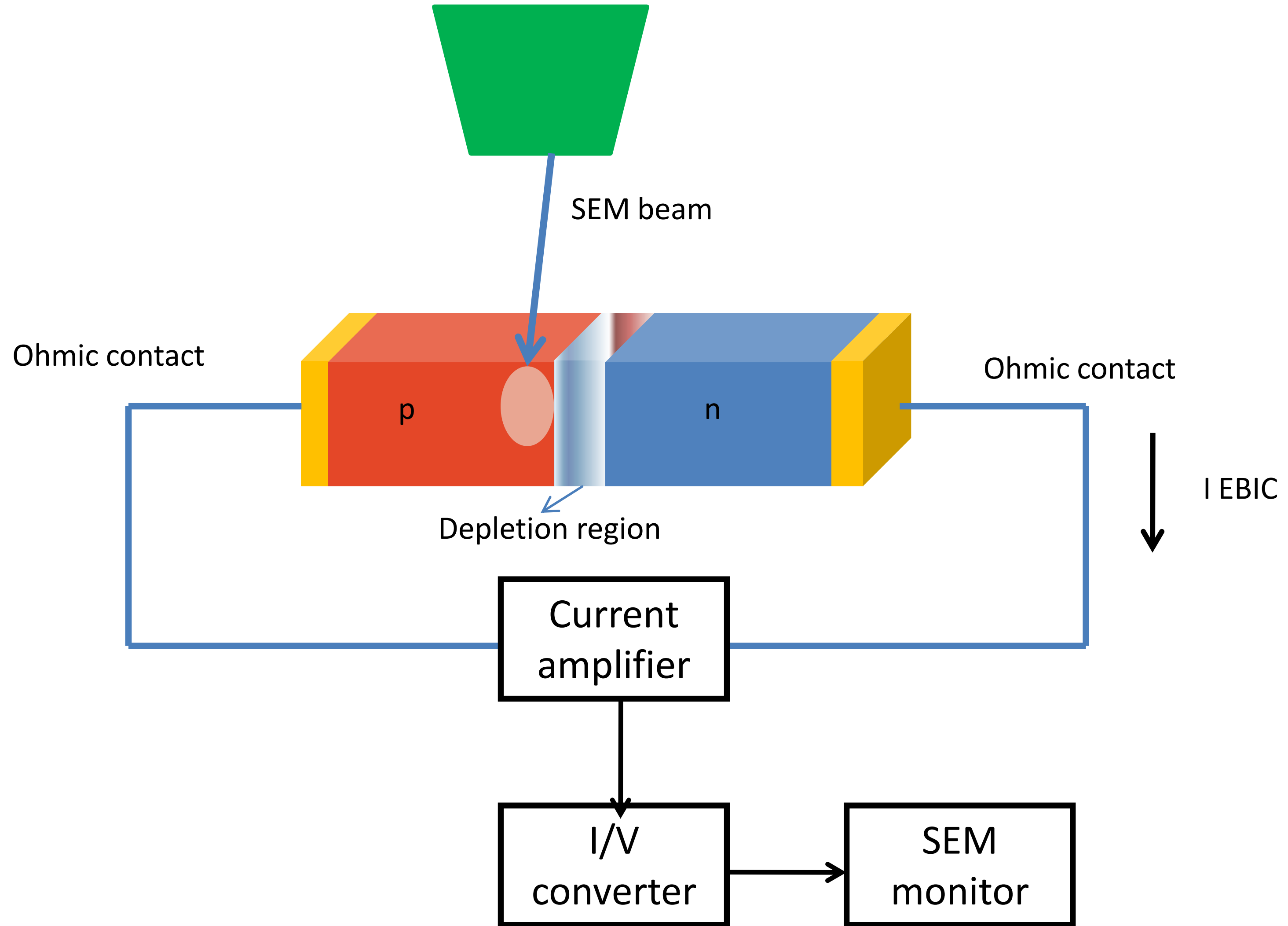
Electron Beam Induced Current

- EBIC born with SEM
- Semiconductor analysis technique used to
  - Map junctions and their defects
  - Measure minority carrier properties
- Specifically used for:
  - Evaluation of semiconductor materials
  - Devices Failure Analysis

Electron Beam Induced Current: Fundamentals

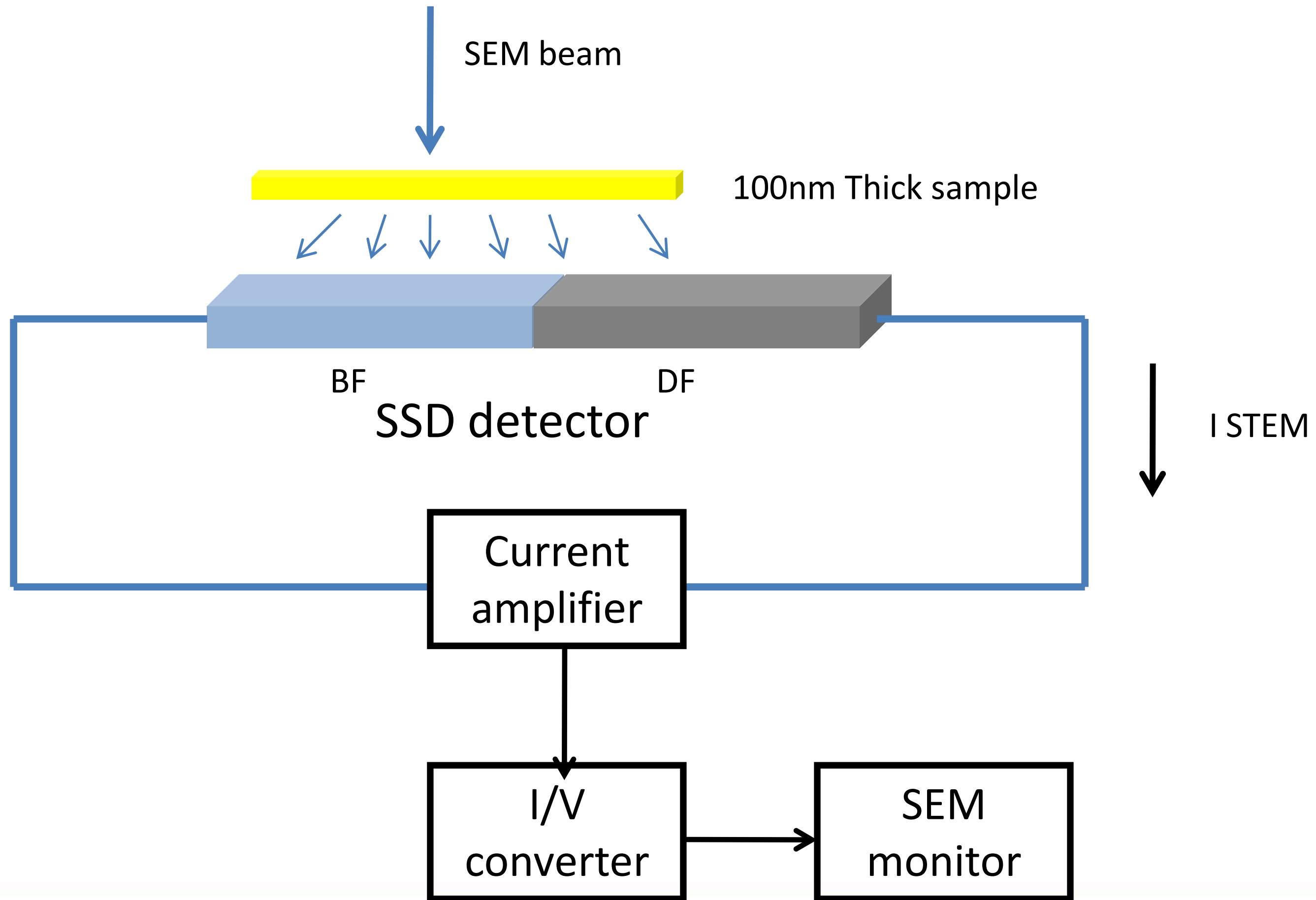
- E-beam generates electron-hole pairs (EHPs) in semiconductor materials
- P-N or Schottky junction's field separates EHPs generated.
- A Picoammeter closes the circuit
- I/V converter generates the EBIC signal

Electron Beam Induced Current



Deceiving STEM

Standard STEM setup



Properties of the STEM detection chain

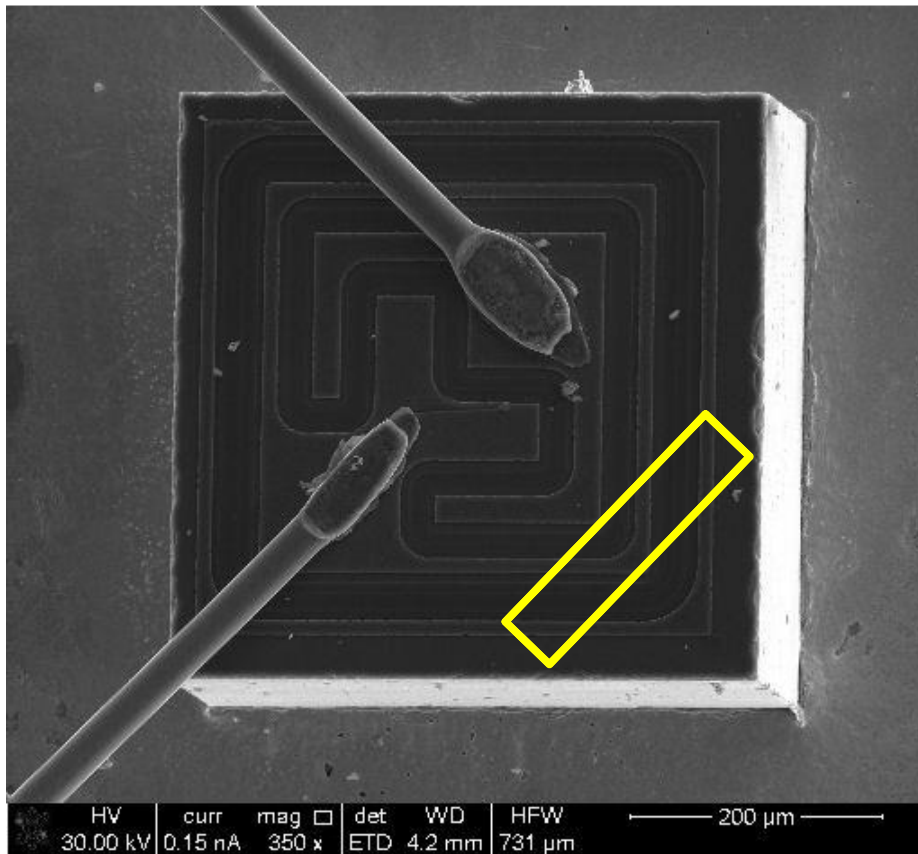
STEM detection chain is:

- Designed to fit electron beam properties
- Fast: up to TV-Rate
- EMBEDDED

EBIC at Dual beam

- Individuating lattice defects
- Addressing FIB cut
- EBIC exploration of the cut

Application: addressing FIB Cut



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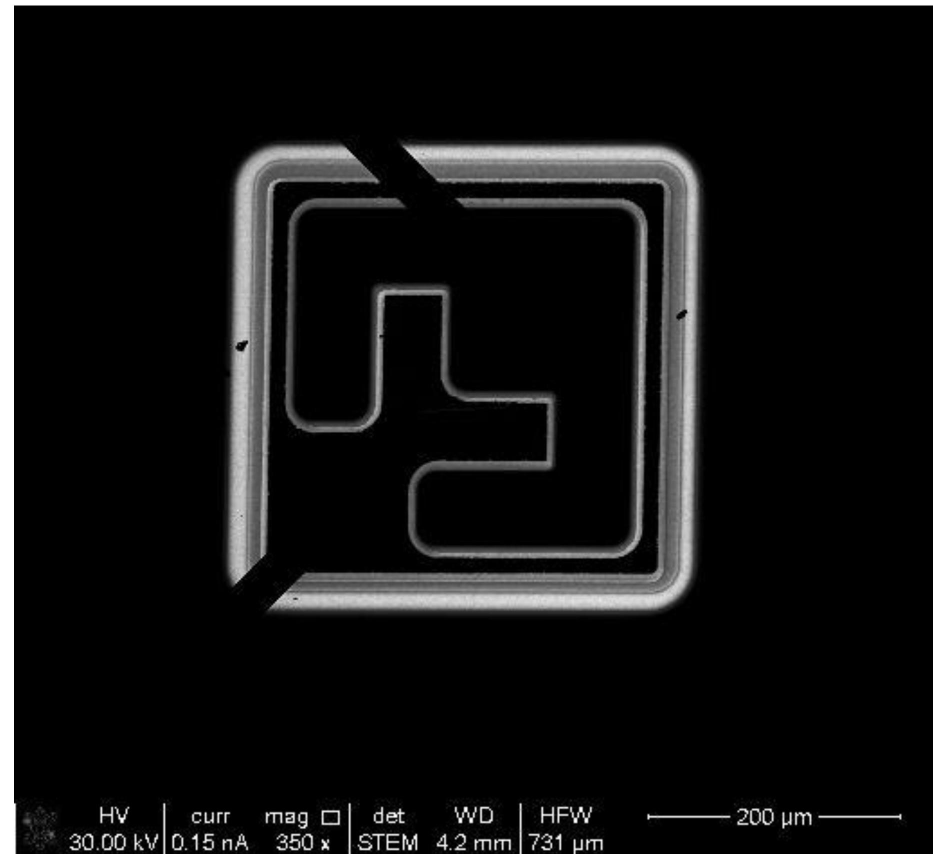
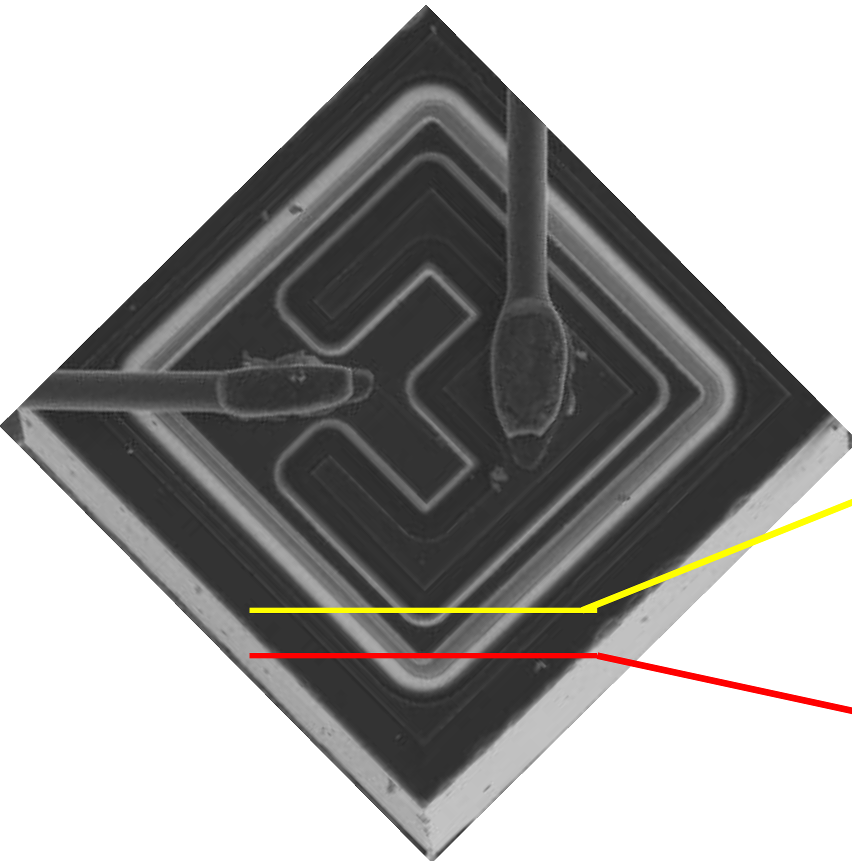
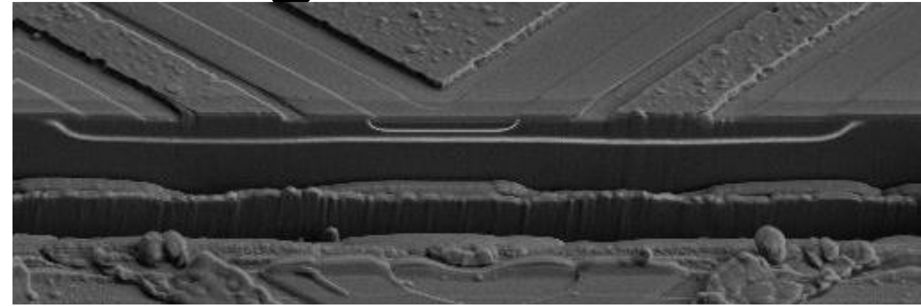
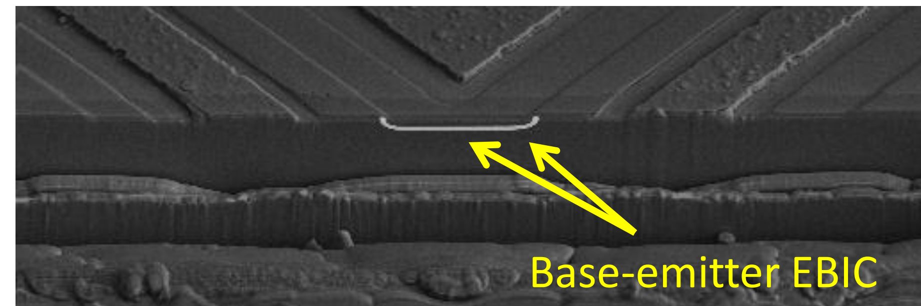


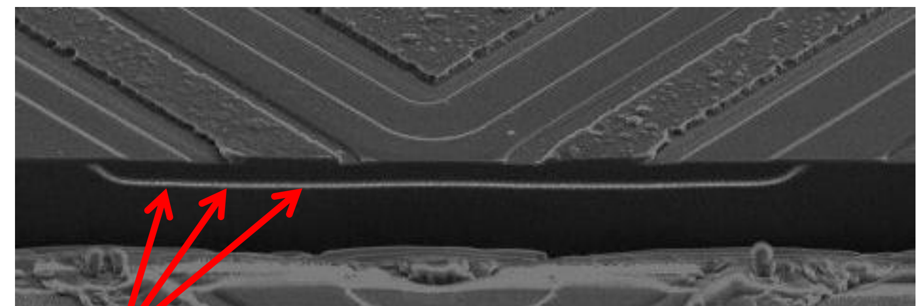
EBIC

Application: addressing FIB Cut







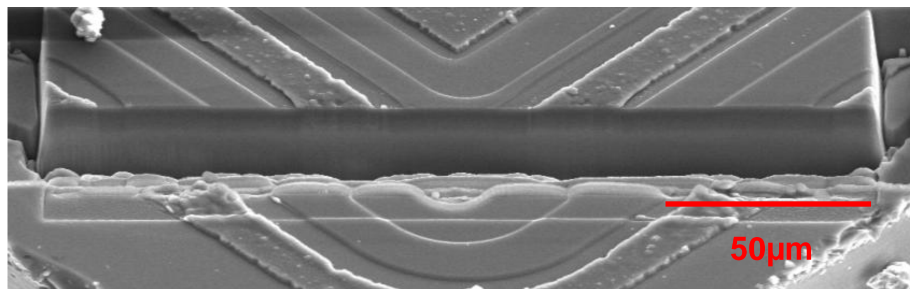


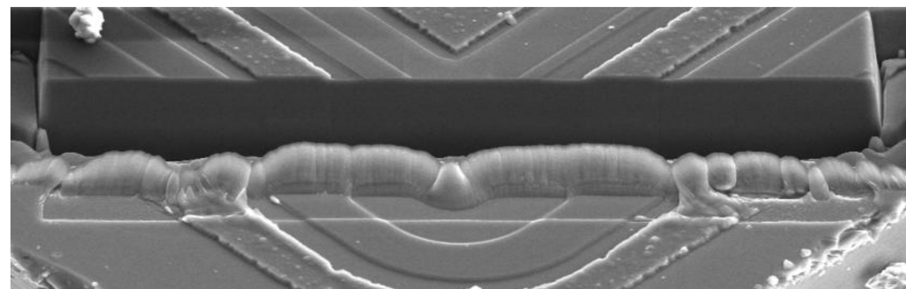
Base-collector EBIC

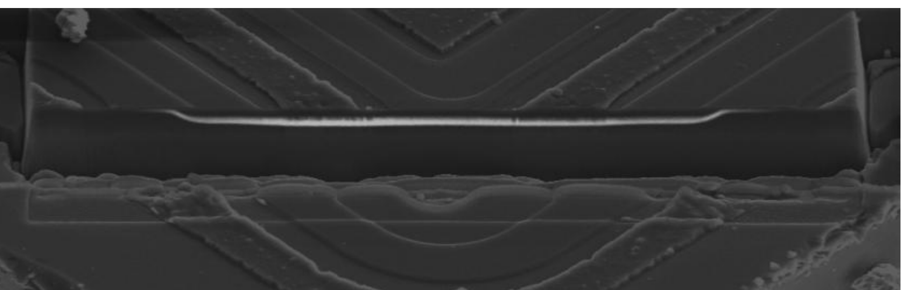
50µm

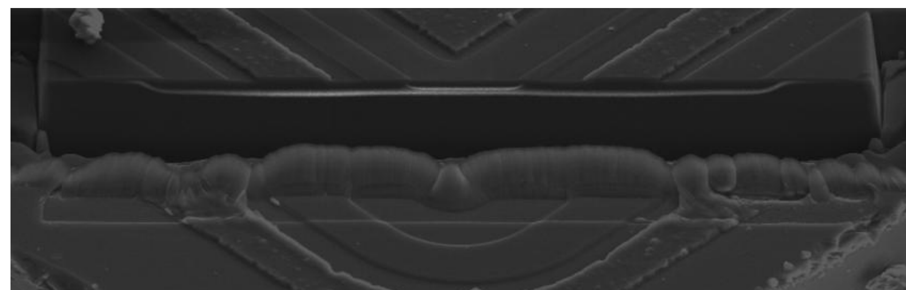
EBIC tomography

- progressive and alternate FIB erosion of the indicted part
- systematic cross-sectional EBIC of the exposed surface









First slice

Last slice