EMCM4 testing results
– after AI1 and AI2 –

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Motivations

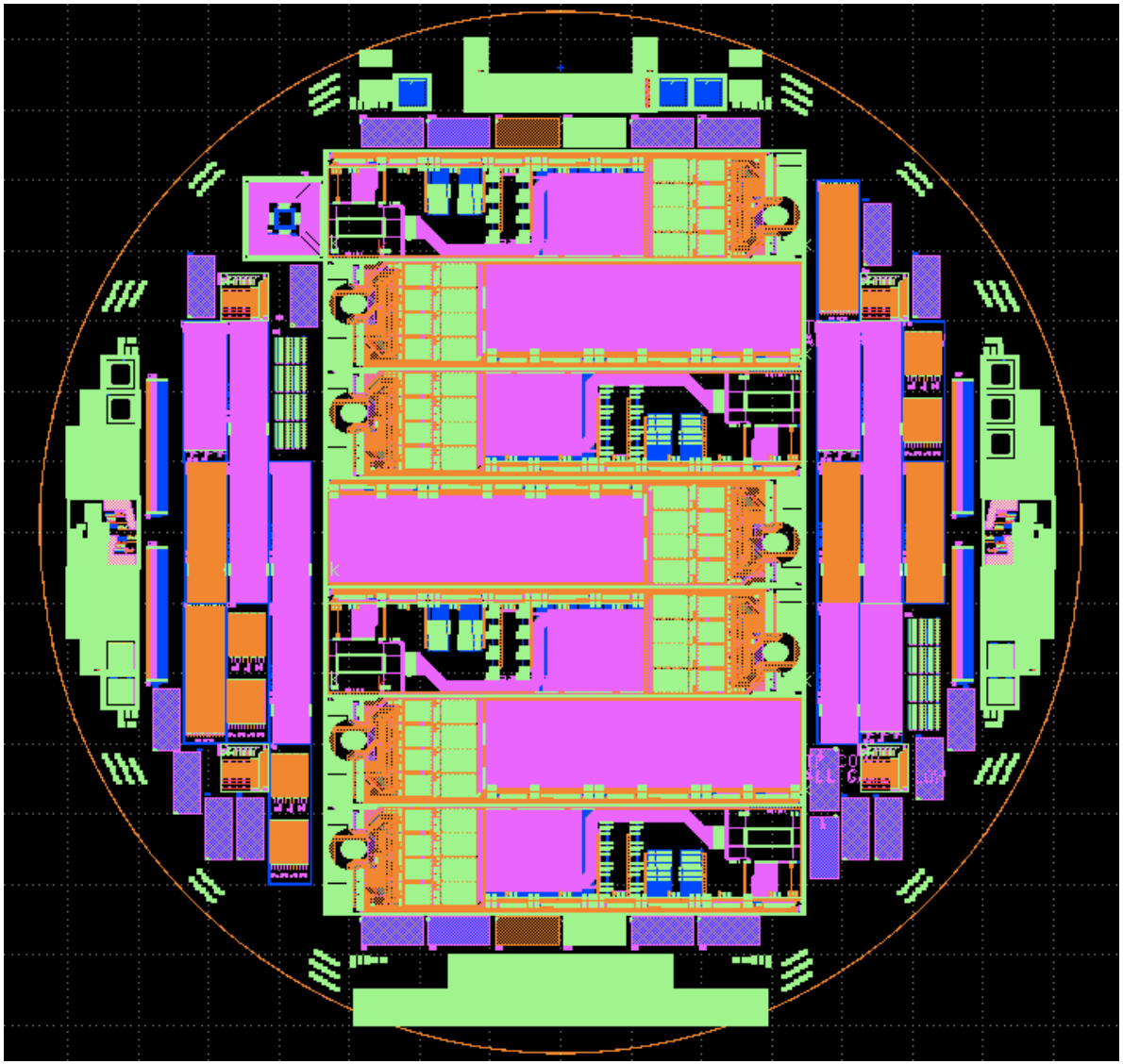
Main purposes:

- Confirm the stability of the metal system of EMCM3 (W17 and W18)
- Verify influence of final topology on yield (e.g. Al lines stepping over poly lines)

Layouts under test:

- EMCM (SOI and standard)
- PXD9 (SOI, poly, all implants)

EMCM layout

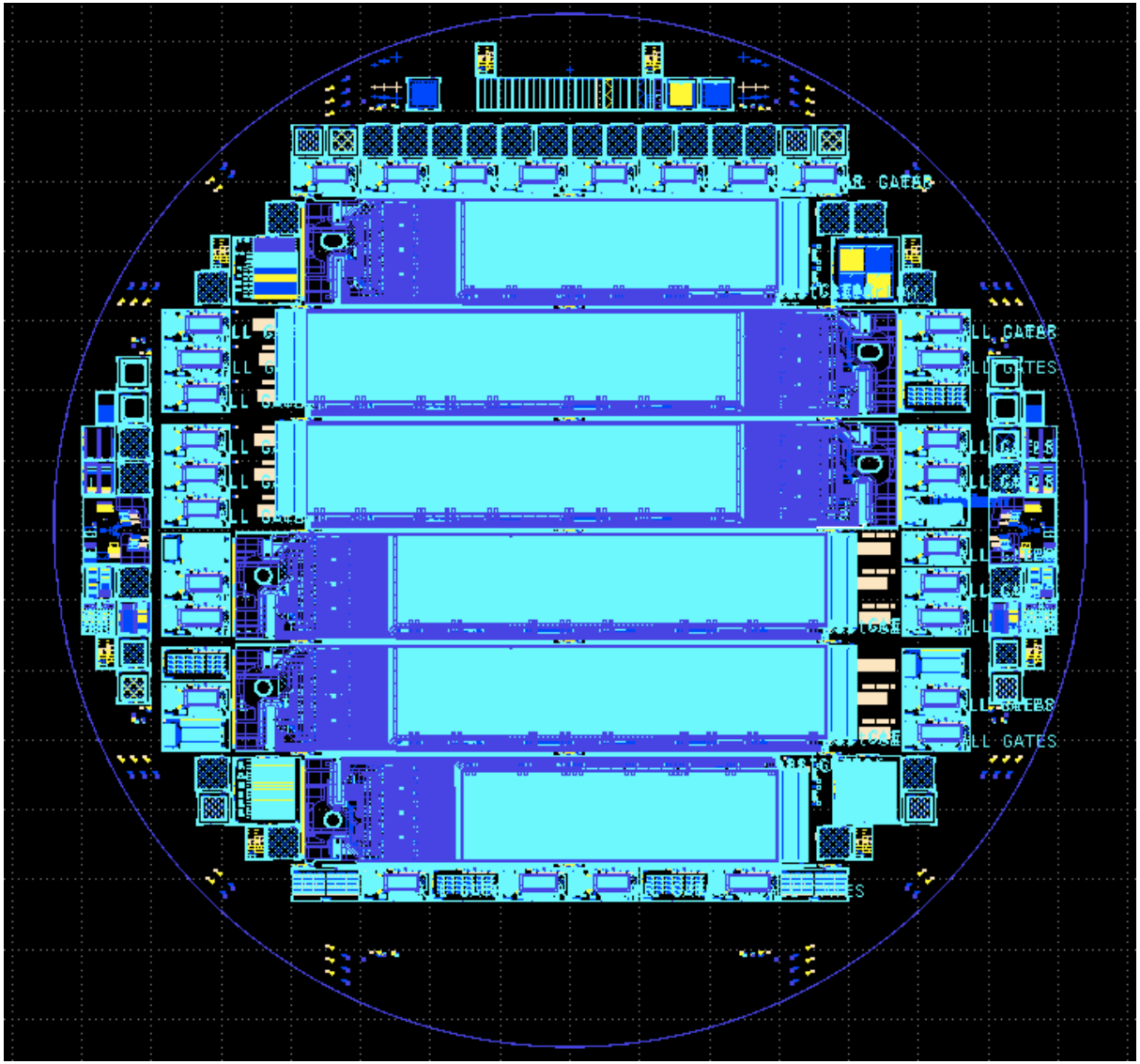


1. **EMCM3 CH1**: EMCM w/o diff. clock
2. **1**: PXD9-like
3. **EMCM3 CH2**: EMCM w/o diff. clock
4. **2**: PXD9-like
5. **EMCM3 CH3**: EMCM w diff. clock
6. **3**: PXD9-like
7. **EMCM3 CH4**: EMCM w diff. clock

plus

- 3 contact chain structures
- 7 comb structures
- 8 breakdown structures

PXD9 layout



1. **IF**: Inner forward
2. **OFU**: Outer forward
3. **OFD**: Outer forward
4. **OBU**: Outer backward
5. **OBD**: Outer backward
6. **IB**: Inner backward

EMCM4 production

Batch	Wafer no.	Layout	Type
I	21	PXD9	SOI
	24	EMCM	SOI
	25		standard
	26		standard
II	22	PXD9	SOI
	27	EMCM	standard
	28		standard

EMCM4 – EMCM layout yield results

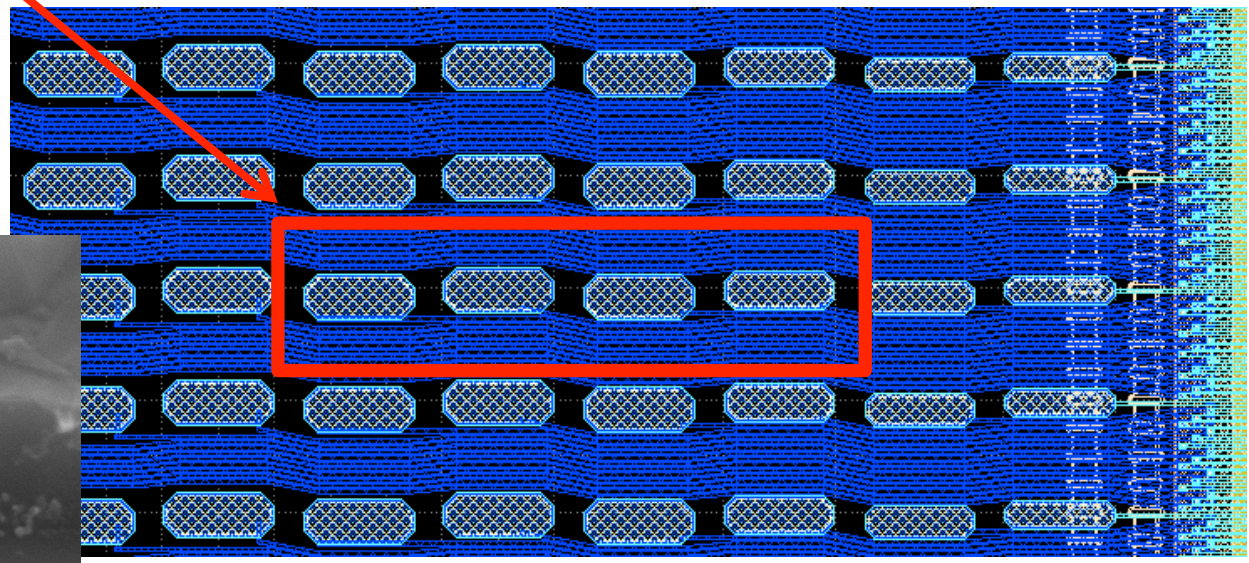
Batch	Wafer no.	Type	Comb* Structures	Contact chains	Breakdown Structures	PXD9-like**
I	24	SOI	100%	100%	> 320 V	100%
	25	standard	100%	98%	> 340 V	83%
	26	standard	100%	100%	> 80 V	100%
II	27	standard	100%	100%	tbt after Cu	100%
	28	standard	100%	100%	tbt after Cu	100%

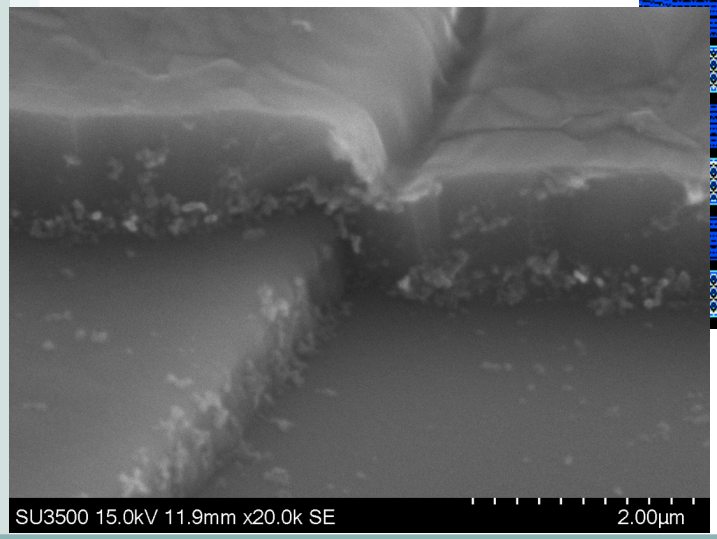
* Detection of lateral shorts and inter-metal shorts
** Only lateral shorts detection

EMCM4 – PXD9 layout yield results

Batch	Wafer no.	Type	Lateral shorts
I	21	SOI	100%
II	22	SOI	99.6%*

* Detected lateral shorts among 4 adjacent drain lines in the middle of the drain pads region (OFU).





Short not identified after optical inspection

Conclusions and future developments

- ✓ 5 wafers with EMCM layout tested with yield ~ 100%
- ✓ 2 wafers with PXD9 layout tested with yield > 99.5%
- ✓ Metal system stability confirmed for the thick IDL1 option (i.e. W17 & W18 of EMCM3-II typology)
- ✓ Yield independent of the topology

- ➢ Verify discontinuities and inter-metal shorts in PXD9-like and breakdown voltages for batch II
- ➢ Test periphery with ATG machine
- ➢ Test discontinuities and inter-metal shorts in very long drain lines in wafers with PXD9 layout

Thank you for your attention!