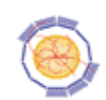


WP3-3

IP blocks

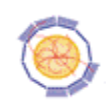


G. Martin-Chassard
OMEGA/IN2P3



Work-package title : Shareable IP blocks for HEP

- Goal : provide a 2nd lot of IP blocks for analog needs in HEP with full documentation and laboratory tests.
- 1st set organized by CERN in 65nm (see next talk).
- A 2nd set will be organized by OMEGA for needs in calorimetry, TPC,...
- OMEGA/LAL → OMEGA/IN2P3

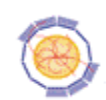


- Electronics needs in calorimeters and TPCs :
 - large dynamic range,
 - high speed ,
 - low noise,
 - low offset,
 - need of precise capacitors and resistors, ...

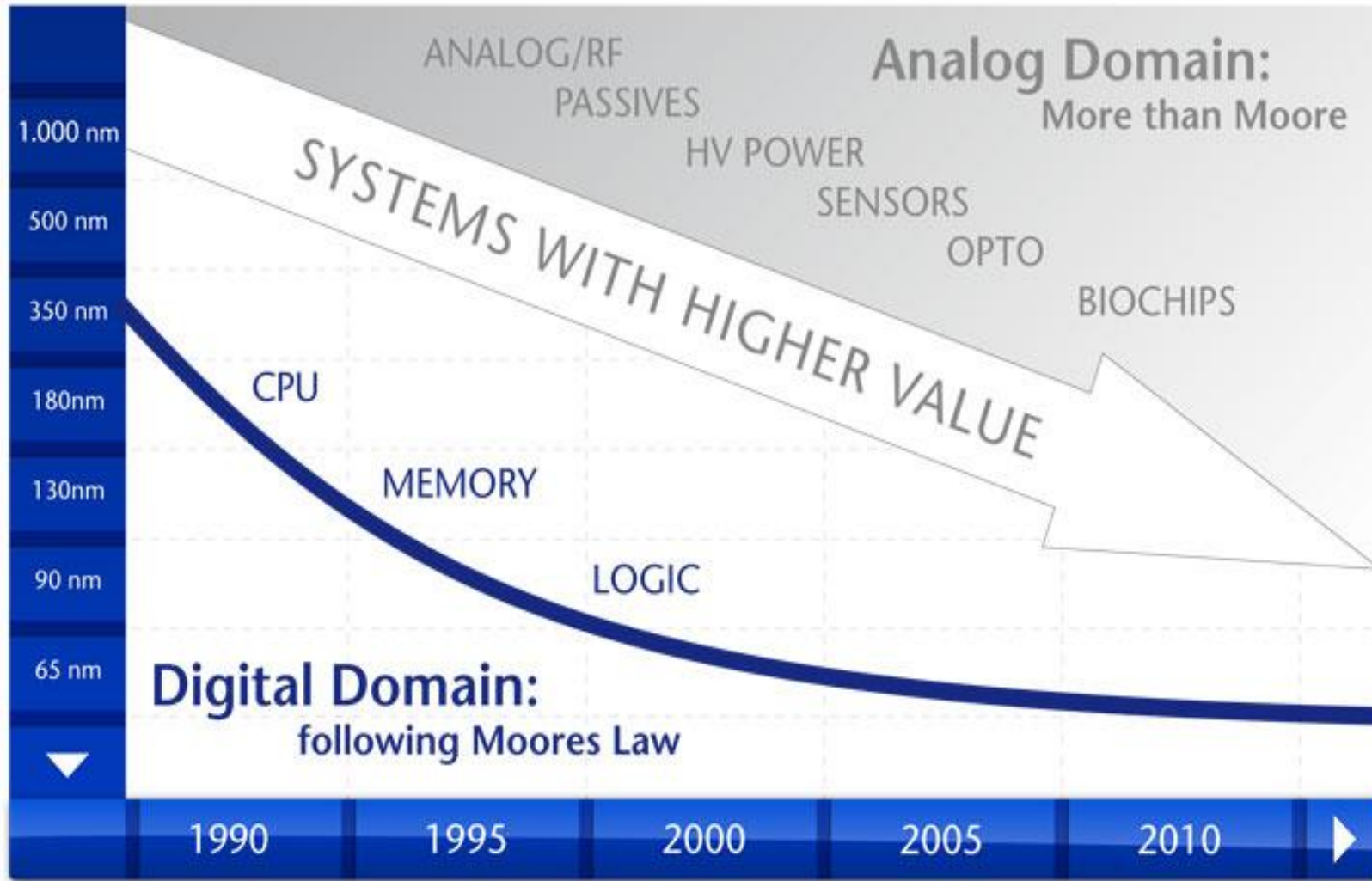
- Blocks :

ADC, TDC, DAC, Bandgap, OTA, Rad-tol memory, SEU resistant flipflop ...

- Technology :
 - SiGe or CMOS SOI, HV
 - 130 nm or 180 nm
 - IBM, ST micro, AMS ...

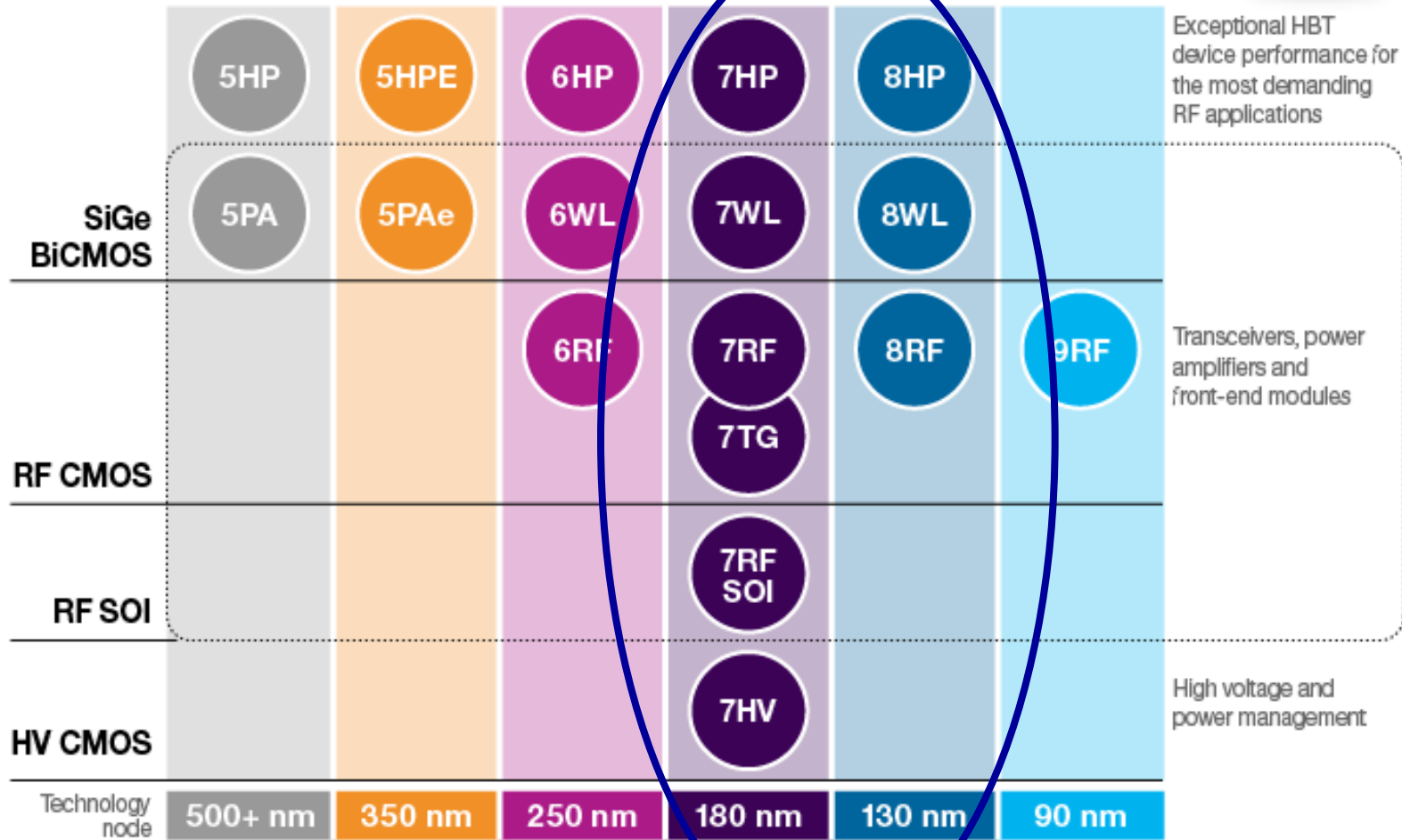


Miniaturization vs. Diversification





Specialty Foundry Roadmap

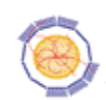


- IBM SiGe 130 nm :
 - 6 MPW runs / year by MOSIS
 - 5 Metal (1thick) – 1 poly – Cmim
 - ft = 200GHz
 - power supply : 1.2V - 2.5V (I/O)

- IBM SiGe 180 nm :
 - 6 MPW runs / year by MOSIS
 - 5/7 Metal (1 thick) – 1 poly – Cmim
 - ft : 60GHz
 - power supply : 1.8V – 3.3V (I/O)
 - Also available in IBM CMOS 180 nm :
 - HV (20V)
 - SOI

Price ? Minimal size ?

Which technology will be perennial ?



Main advantage for IBM
 180nm process :
 Large commercial market
 in telecom and mobile
 devices



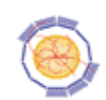
IBM technologies for mobile devices



- **ST micro SiGe 130 nm :**
 - Price : 3500€/mm² (min. 1mm²)
 - 4 MPW runs / year by CMP
 - 6 Metal – 1 poly – Cmim
 - Triple well
 - power supply : 1.2V or 2.5V (option)
 - Bipolar : Ft=150 GHz , Beta=1000 – MOS : low VT
 - digital cells (VHDL)
- **Also available in CMOS 130nm**
 - HV : 4.9V for analog blocs -2200€/mm²
 - SOI : 4000€+3000€/mm²
- **Time of life, duration :** has been available for 4 years
→ Access for prototyping : for how long ?

- AMS CMOS 180 nm :
 - Price : 1200€/mm² (min. 5mm²)
 - 4 MPW runs / year by CMP
 - 6 Metal (one thick) – 2 poly – Cmim – High Res
 - power supply : 1.8V or 5V
 - MOS : 4 GHz
 - I/O cells, digital cells, RAM ..
 - Time of life, duration : 10 years
- Also available :
 - HV : 20V or 50V
- Main advantage :
 - Time of life, duration : 10 years
 - Automotive market

Not expensive but no SiGe



Milestones and deliverables for 2nd set of IPs:

- blocks (**SiGe**) due for month 44 (**September 2014**)
- Characterization of these blocks before month 48 (**January 2015**)

→ All people interested in these blocks are welcomed

Thank you
for your attention