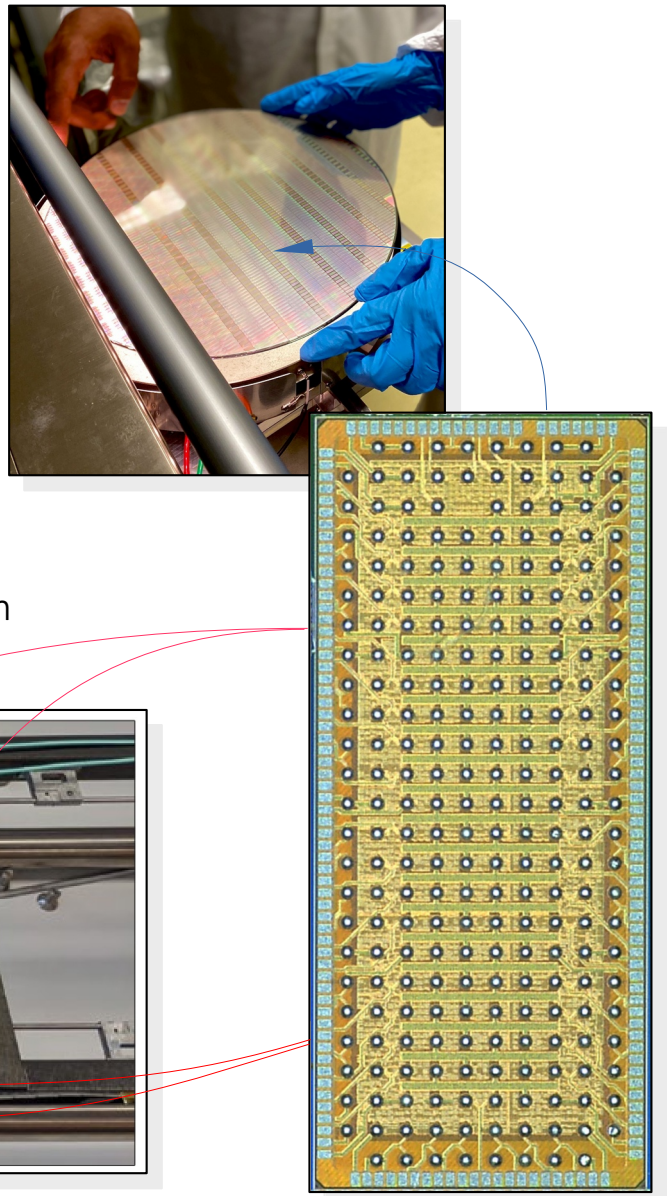
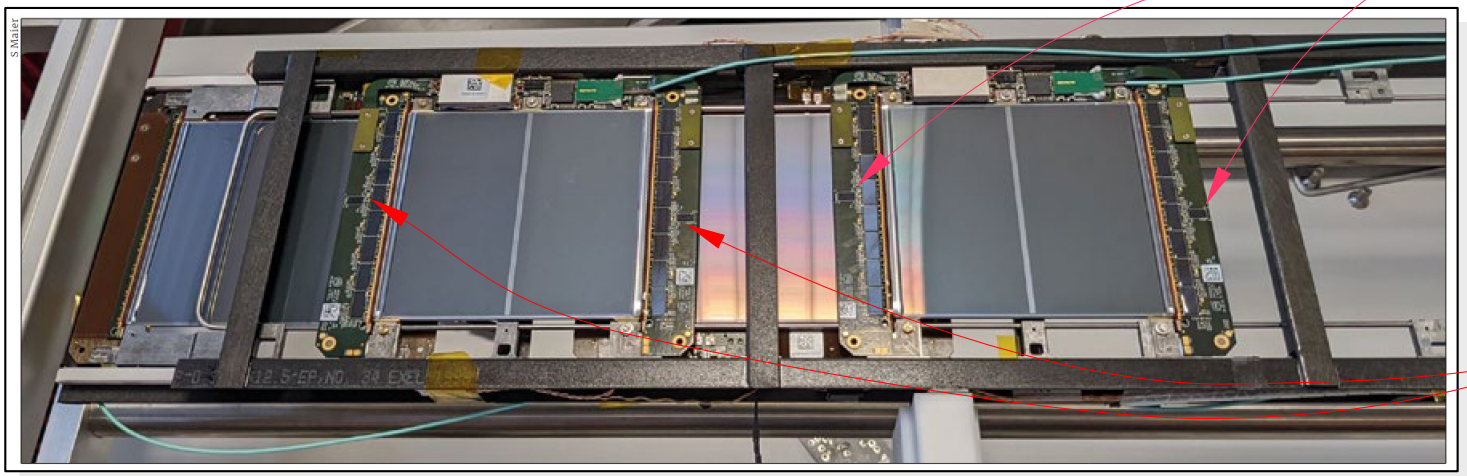
# The design of the CIC

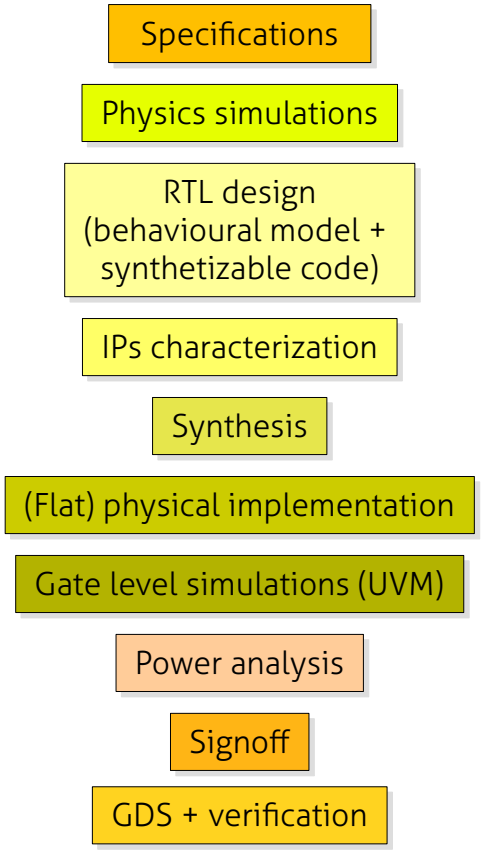
- Concentrator IC (CMS upgrade for the High Luminosity LHC)
- TSMC 65n technology
- flipchip (bumps) + wirebond pads (for testing purposes) without encapsulation
- radiation tolerance: ~100Mrad TID in worst case
- Single Event Transient and Upset resistant
- 3 IRs full time from 2017 to 2019 (IP2I)
- three foundry submissions (2018, 2019, 2021)
- punctual support from CERN ASICS group (management, design and tools)
- wafers production already started: 30K diced and tested chips to be integrated in the CMS OT Tracker





Photograph of two CMS Outer Tracker Strip-to-strip (2S) modules: the CICs are highlighted

# Design methodology at IP2I




The CIC design followed a Digital On Top methodology:

- fully digital core design (data handling, store and forward)
  - RTL code written in System Verilog and firstly used for design specs validation
- few analogue blocks (phase data alignment and sLVS transmitters and receivers) designed within CMS collaboration

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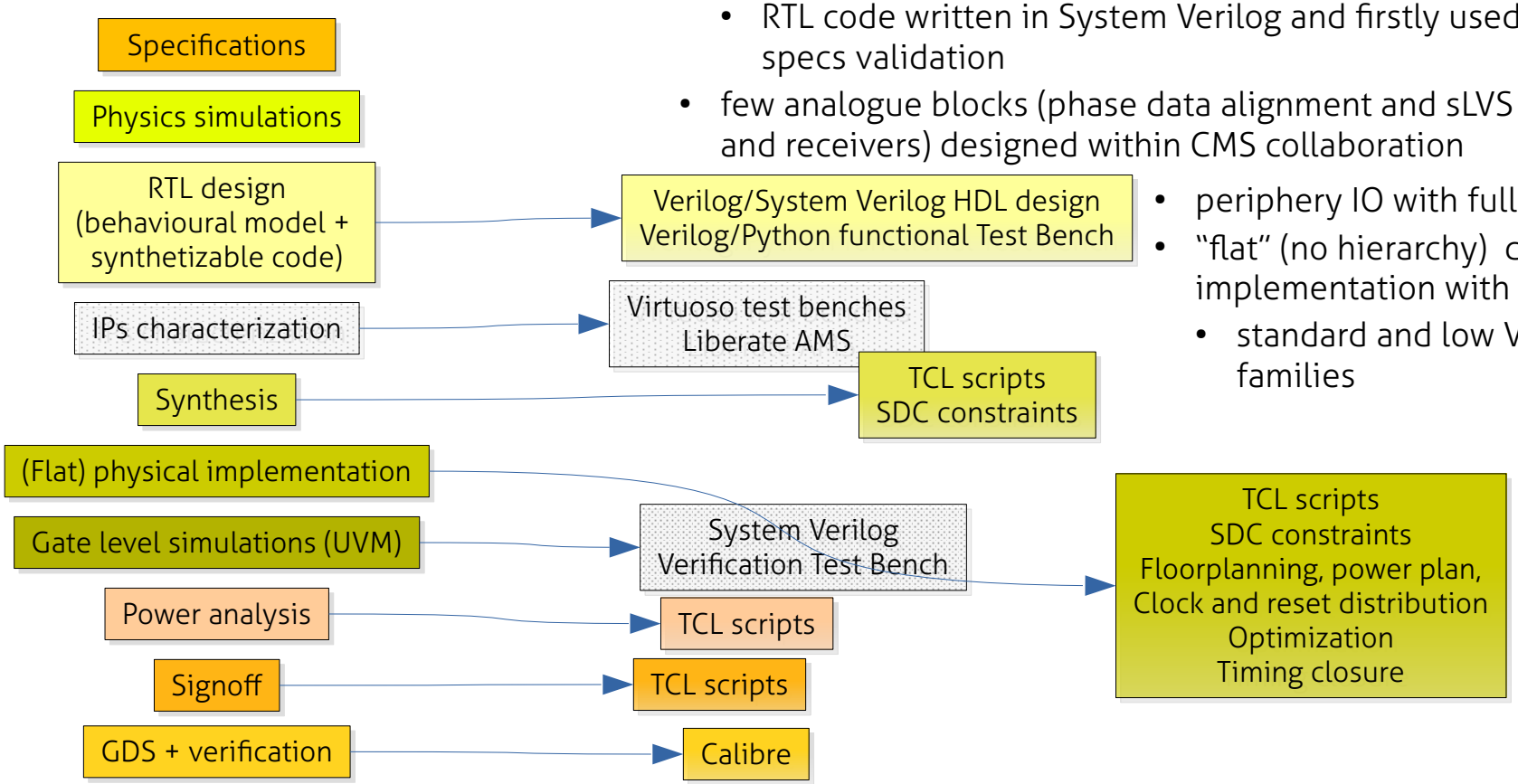


- periphery IO with full custom ESD and IOs
- "flat" (no hierarchy) digital implementation with single core supply:
  - standard and low VT standard cell families

# (many) questions