# Studies of the CBC3.1 readout ASIC for CMS 2S-modules

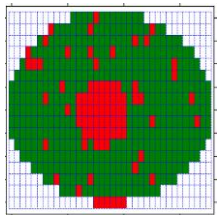
- CBC is ASIC to be used for CMS tracker upgrade 2s modules and it is currently in the production phase and wafer probing is on going.
- The performance has been proven in modules with chips from engineering run in beams and with TID and SEU tests.

## Wafer probing summary

- Engineering run (2018) – 13 wafers in Lot1
  - Average Yield > 80 %, yield patterns are observed in all the wafers
- Pre-production run (2019) – 24 wafers per lot, Lot2 & Lot3
  - Average Yield > 80%, yield patterns are observed in some of the wafers
  - Memory errors and I2C register corruption were identified at **low temperature test at -30 °C**
- Production run (2021-) – 270 wafers in Lot4 – Lot19, total 500 wafers are expected
  - low T issues were studied in detail and wafer probing continues at room temperature
  - **Yields from most lots (sampled) > 75 %** with additional tests to identify low T issues, strong lot dependence in the yield and patterns

The impact of the issues found at low T test on occupancy is estimated to be < $10^{-4}$ compared to an expected occupancy of 1-2%.

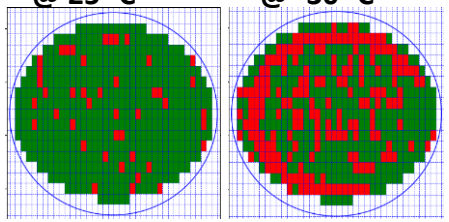
**wafer (a) in Lot1**



developed on a wafer probing station to study yield and performance in operation conditions of the CMS experiment. *Not for wafer probing for production wafers due to the technical difficulty*.

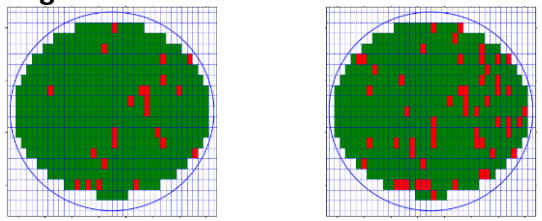
**wafer (b) in Lot3**

**@ 25 °C** **@ -30 °C**



**wafer (c) in Lot9 @ 25 °C**

**original tests** **with the additional tests**



**wafer (b) in Lot3**

**@ 25 °C with the additional tests**