Si sensors for LumiCal

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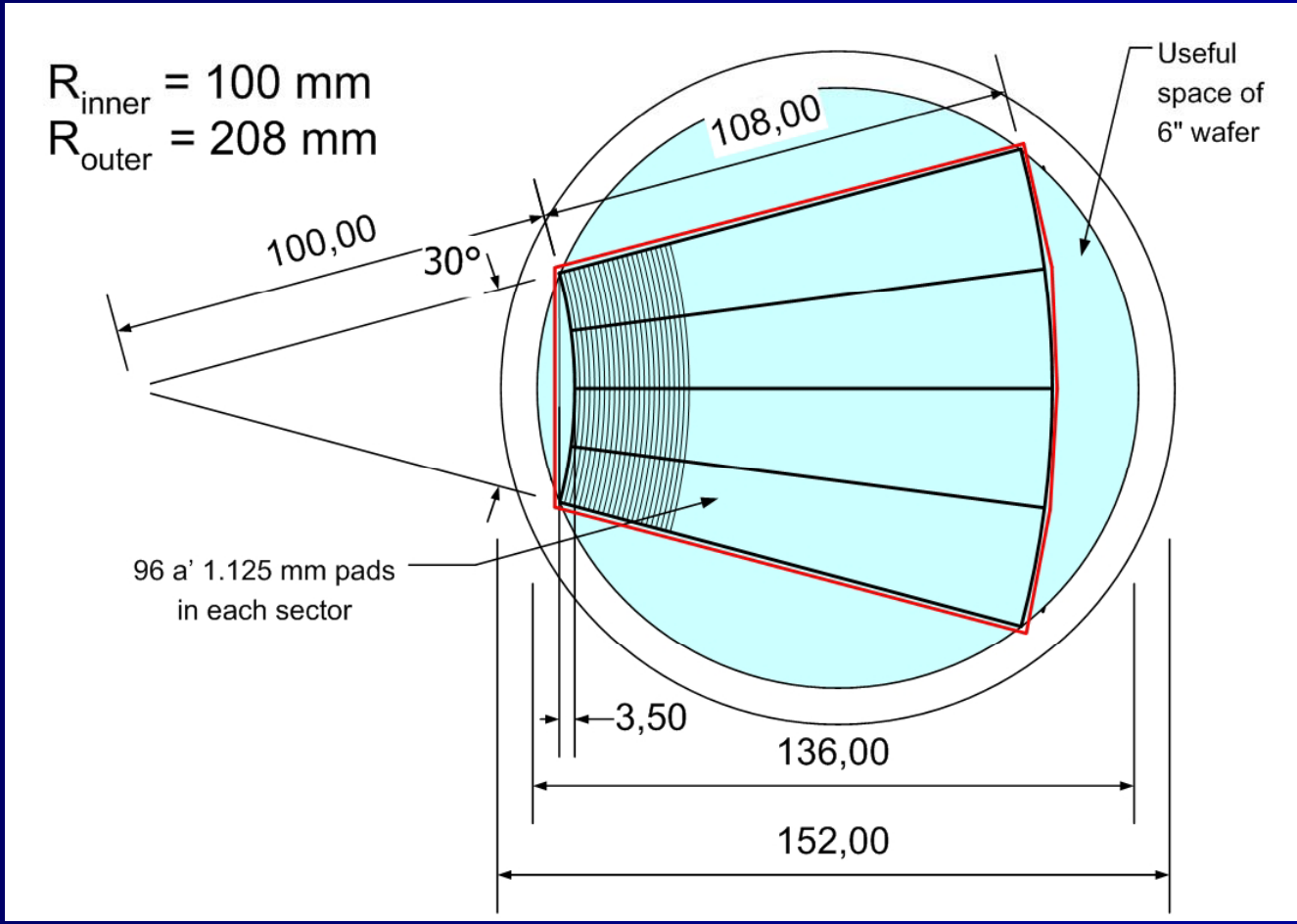
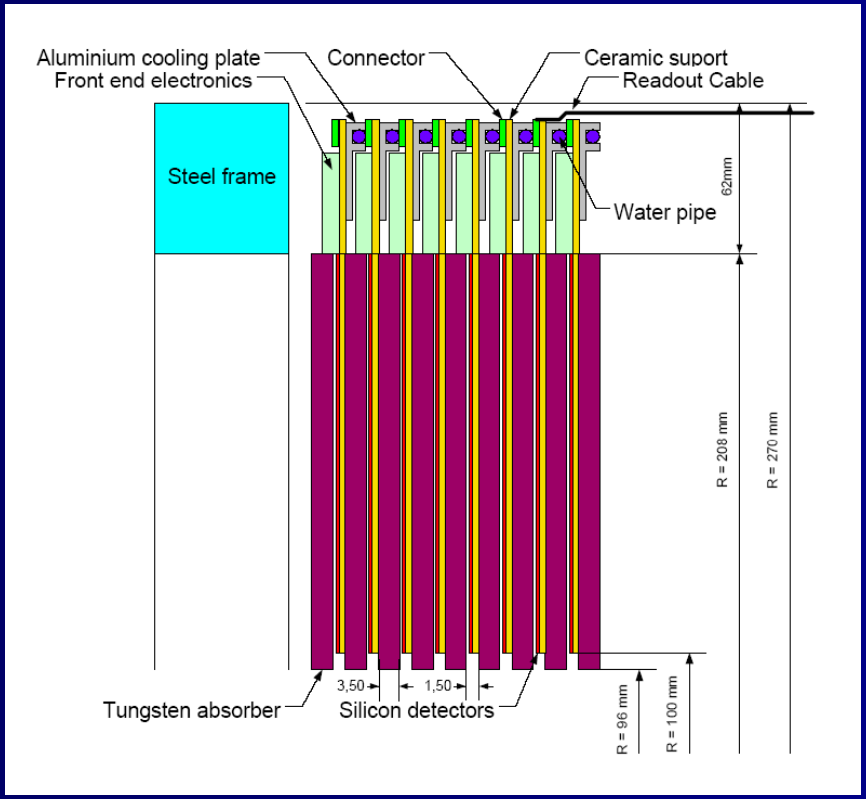
Proposed Si sensor prototype for LumiCal



Hamamatsu offer

- Si wafer thickness = 320 µm
- Dark current = 10 nA/cm^2 @ 200 V => ~5 nA for the largest pad
- Clearance cutting line to guard ring = ~2 times wafer thickness (~640 µm)
- Time schedule = ~5 months
- Costs (masks, prototyping) = ~18600 €
- Detector cost = 930 €/pcs. @ 40 pcs.

LumiCal cross section



- Si detectors glued to ceramic support or (most probably) directly to tungsten absorber with capton foil insulation.
- The gap between plates should be reduced from 1.5 mm to ~1 mm (or less) using bump bonding (better energy res.).
- Fan-out based on thin capton foil

Summary

- We are very close to place a Si sensors prototype production.
- We are discussing with Hamamatsu fan-out production and bump bonding.
- Still lot of problems to be solved: bump bonding to the front end electronics „PCB”, bump bonding reliability, fan-out crosstalk & capacitance.