CDF Burn-in Experience

- Hybrid Burn-in
  - → 4 days with extensive tests at start/end
  - → ~9 out of 8000 chips failed (0.1%)
- DOIM Burn-in
  - → ??????
- Ladder Burn-in
  - → 4 days with periodic readout tests
  - → 126 pinholes in 312064 channels (0.04%)
    - – Most occurred early in burn-in (<5 hours)
  - → Failure of HV lines
    - – Leaky paths, sparking between HV, gnd

CDF Burn-in Experience

- After Instillation
  - → 2 failed DOIM packages out of 556 (0.4%)
  - → ???? Single channel DOIM failures

- Assuming same rate of failure are CDF
  - → ~2% SS (~5% DS) rods with at least one chip failure
  - → ~71% SS (~91% DS) rods with at least one pinhole
  - → ~2% SS (~5% DS) rods with at least one optical failure

Projection to CMS

- Assuming same rate of failure are CDF
  - → ~2% SS (~5% DS) rods with at least one chip failure
  - → ~71% SS (~91% DS) rods with at least one pinhole
  - → ~2% SS (~5% DS) rods with at least one optical failure
- CMS should have fewer failures
  - → APV simpler than SVX3D
  - → Optical hybrids more standard than DOIM
  - → Single sided sensors vs. double
- Different technologies may yield higher rates of failure

Experience at CMS

- 1 out of 4 thermal cycled modules at Aachen developed opens (4) between PA-sensor
- 1 additional module had >300 opens develop after 1 thermal cycle
- All previous experience at CMS with non-”final” technology choices