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