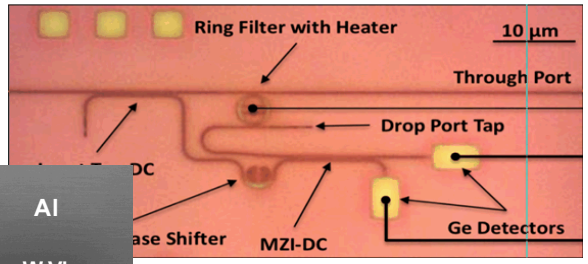
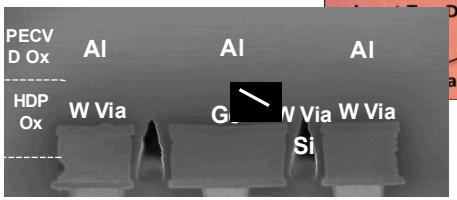
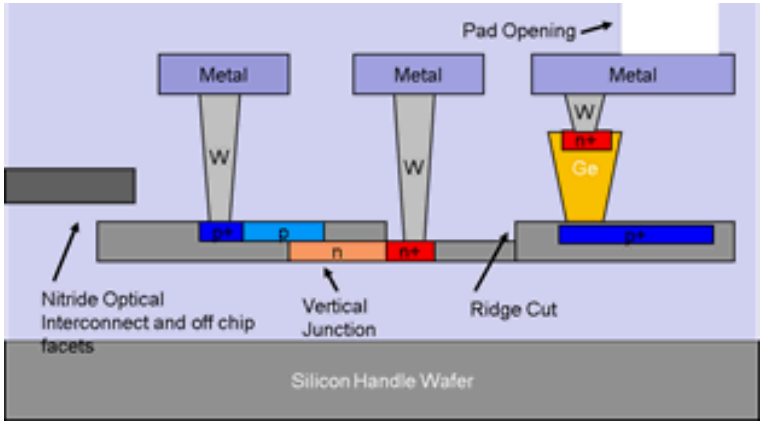
Sandia Silicon Photonics MPW

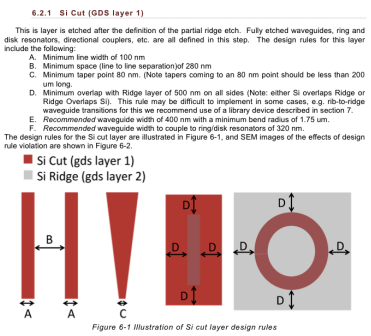
SAND2017-1764PE

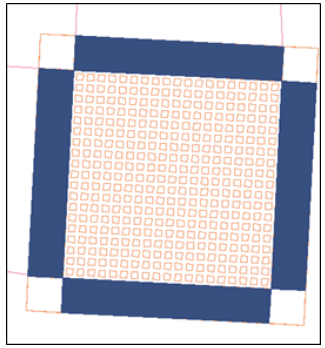
- Sandia's Role
  - Not to compete with Industry
    - Focus on what you cannot get elsewhere
    - Collaborative research best
    - Custom work possible within MPW framework or separate program
  - Generally 2-3 offerings per year
- Process features
  - Silicon passives (silicon rib, ridge guides, silicon nitride guides)
  - Silicon actives (modulators, switches, efficient tuning devices)
    - Vertical junctions for efficient devices
  - Germanium detectors
- Contacts
  - Patrick Chu: pbchu@sandia.gov
  - Anthony Lentine: alentine@sandia.gov
  - Michael Gehl: mgehl@sandia.gov
  - Chris DeRose: cderose@sandia.gov





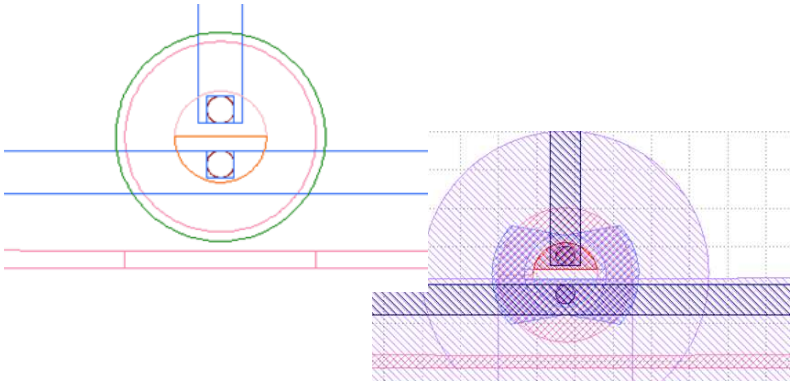






Design Tools and Schedule

- Design tools and features
  - Phoenix Optodesigner pdk
  - Design guide with dimensions, layer definitions
  - Working with Lumerical to implement compact models (in progress)



- Preliminary Schedule
  - October 2017 (full run)
  - April 2017 (Silicon Only)
  - October 2018 (full run)

- Target sequential deliveries after tape out:
  - Passive (2 months)
  - Active Silicon only (4 months)
  - Active Silicon and Germanium (8 months)

- 100 mm minimum area per funding source

- Phoenix Optodesigner library devices
  - Passive waveguides
  - Grating and edge coupling
  - Polarization beam splitters
    - In-plane and grating coupled
  - SiN to Si transitions and crossings
  - Directional, Adiabatic, and MMI couplers
  - Standard or adiabatic ring filters
  - Mode filters
  - Mach-Zehnder modulators
    - Thermal, EO, traveling wave
  - Micro-disk modulators
  - Disk modulator and ring filter silicon thermal tuning elements
  - Germanium detectors
  - …