Comparison of 5 um ring structure exposed at GT and Argonne
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Process Flow

- **substrate:**
  - silicon piece
- **spin coat:**
  - 6% HSQ
  - 2500 rpm, 1250 rpm/sec, 60 sec
  - hot plate bake 80°C, 4 min
  - thickness = 137 nm
- **expose**
  - 100 kV, 2 nA, shot pitch = 2 nm
  - dose = 1500, 3000, 5000, 7000, 10000 uC/cm²
- **develop**
  - 25% TMAH, 30 sec immersion
  - 1 min 30 sec, DI water rinse
conversion 1
hsqcircle500-001.v30, JBXFILER,
output step = 1000 (1 nm grid)

width = 250 nm
outer diameter = 5 um
Dose = 1500 uC/cm²
Dose = 3000 uC/cm²
Dose = 5000 uC/cm²
Dose = 10,000 \text{ uC/cm}^2
conversion 4
hsqcircleLB2.v30, Layout BEAMER, shot pitch fracturing,
pattern units = 1 nm, shot pitch = 2 nm, fracture mode 1,
center to field

width = 250 nm

outer diameter = 5 um
Dose = 1500 uC/cm²
Dose = 3000 uC/cm²
Dose = 5000 uC/cm2
Dose = 10,000 uC/cm²

Ga Tech

Argonne