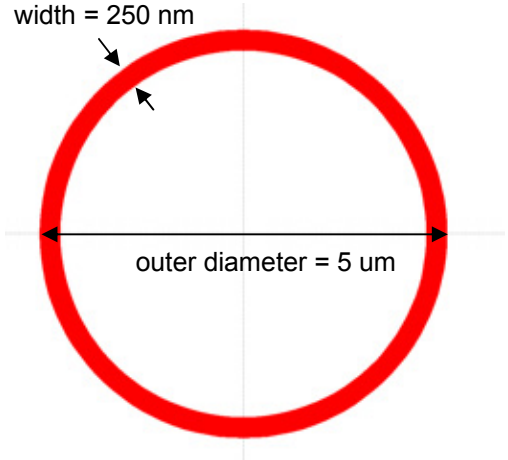
Comparison of 5 um ring structure
exposed at GT and Argonne
1/5/10

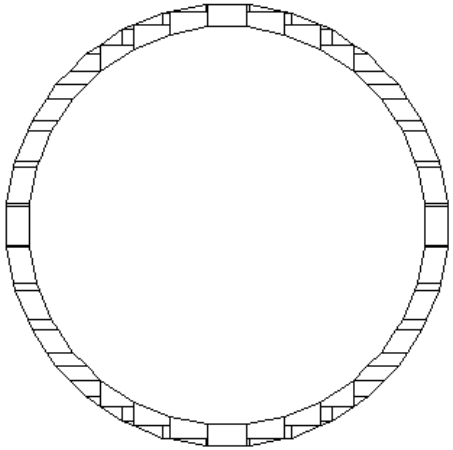
Process Flow

- 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



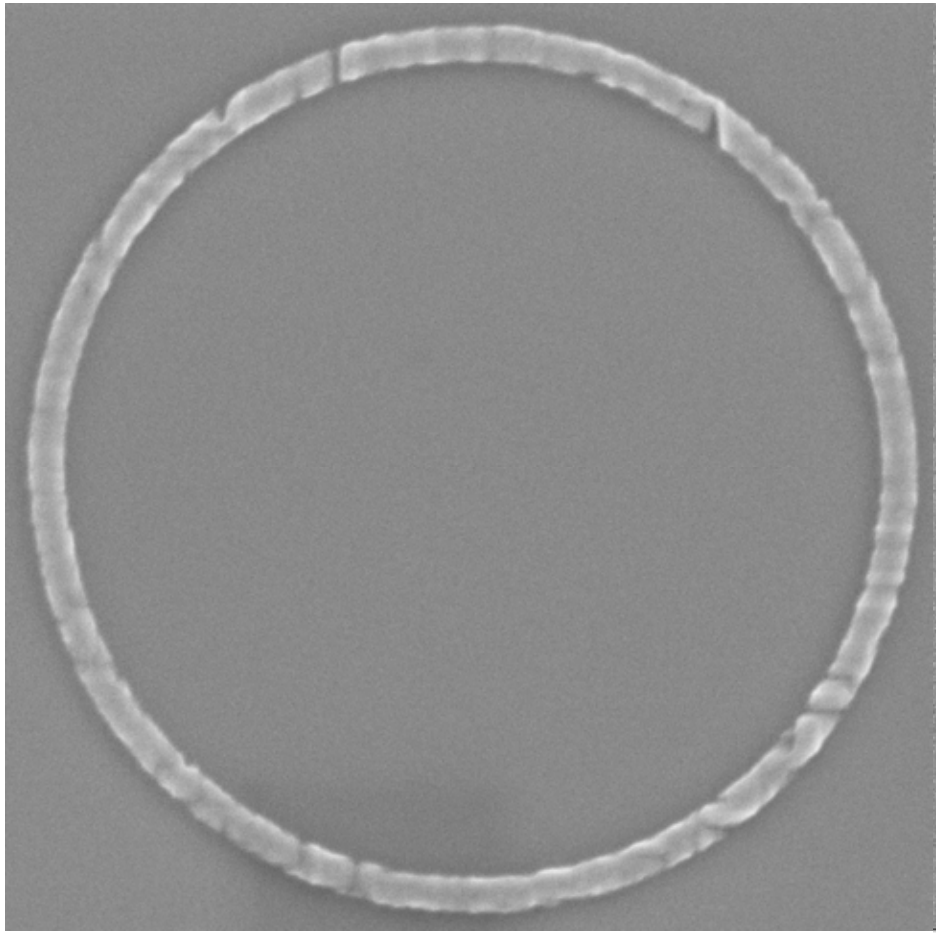
conversion 1

hsqcircle500-001.v30, JBXFILER,
output step = 1000 (1 nm grid)

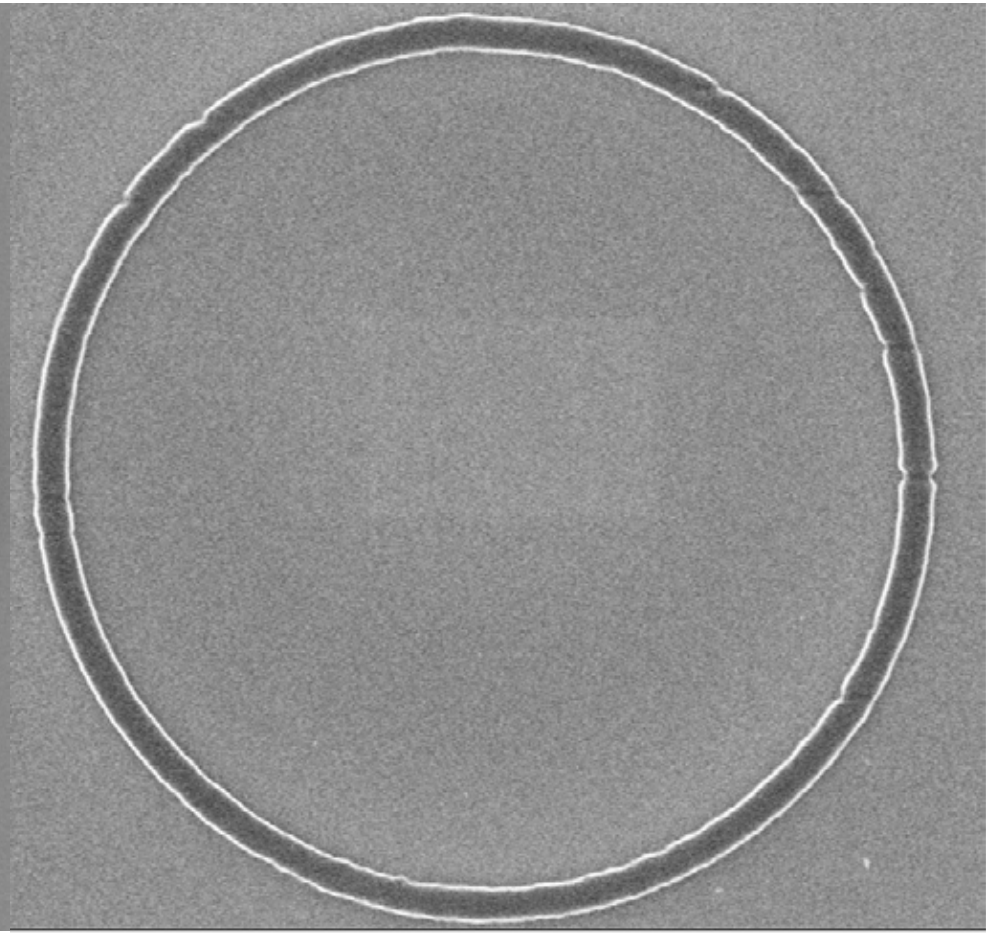


Dose = 1500 uC/cm2

Ga Tech

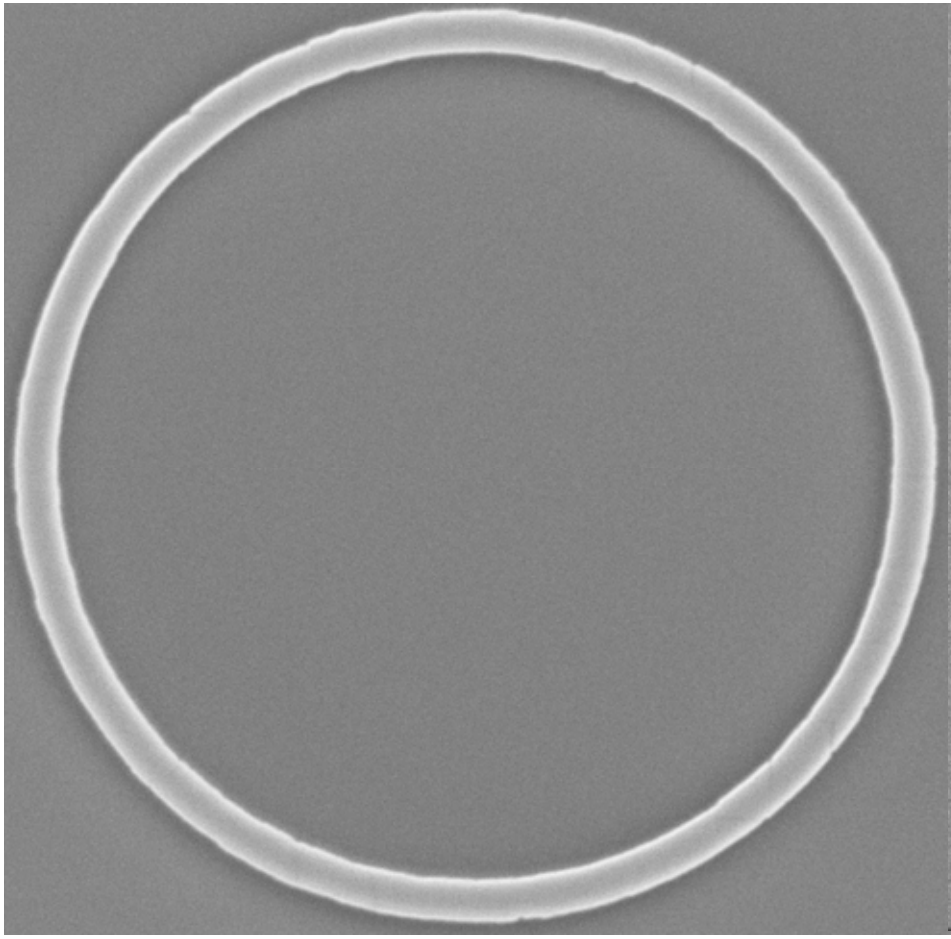


Argonne

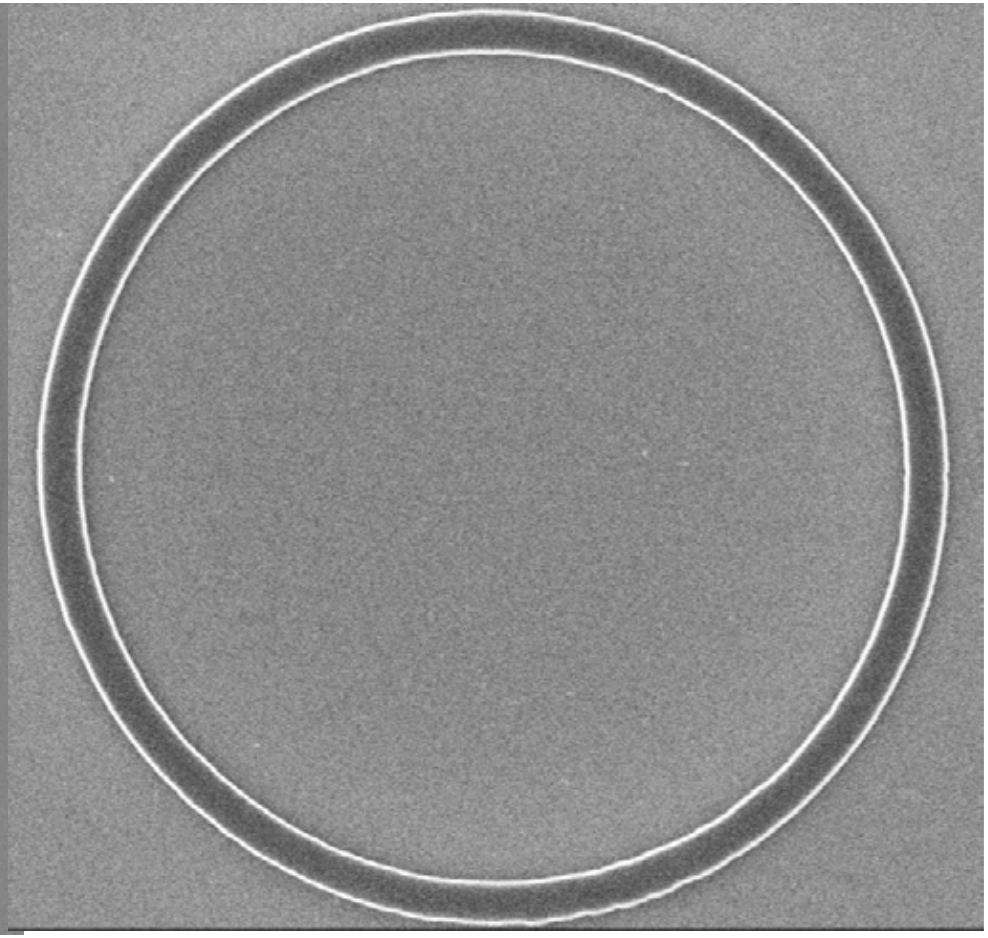


Dose = 3000 uC/cm2

Ga Tech

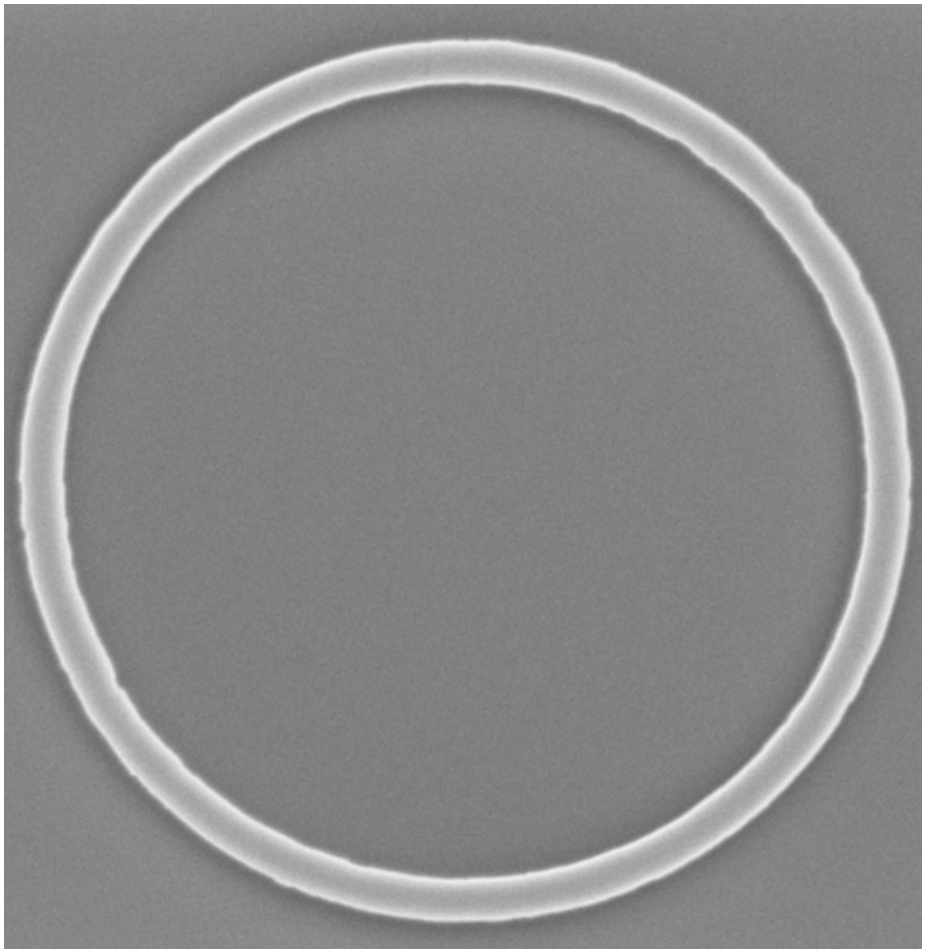


Argonne

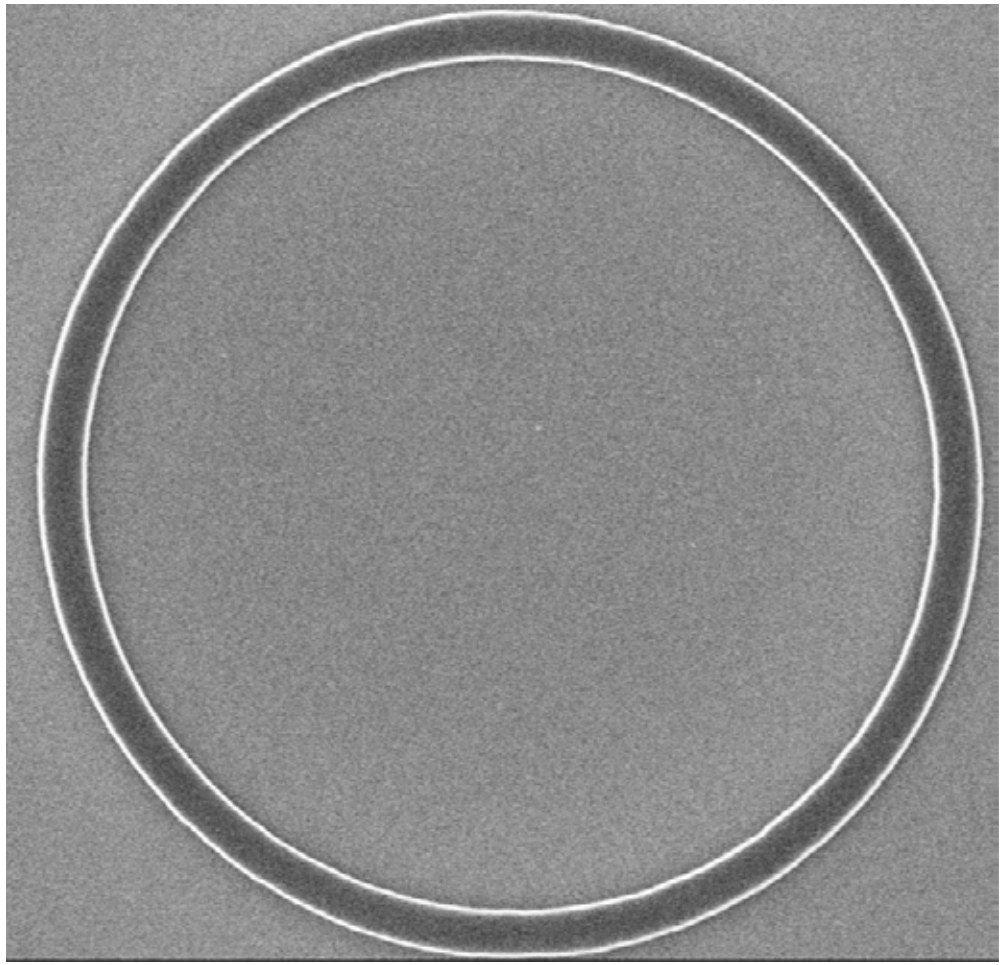


Dose = 5000 uC/cm2

Ga Tech



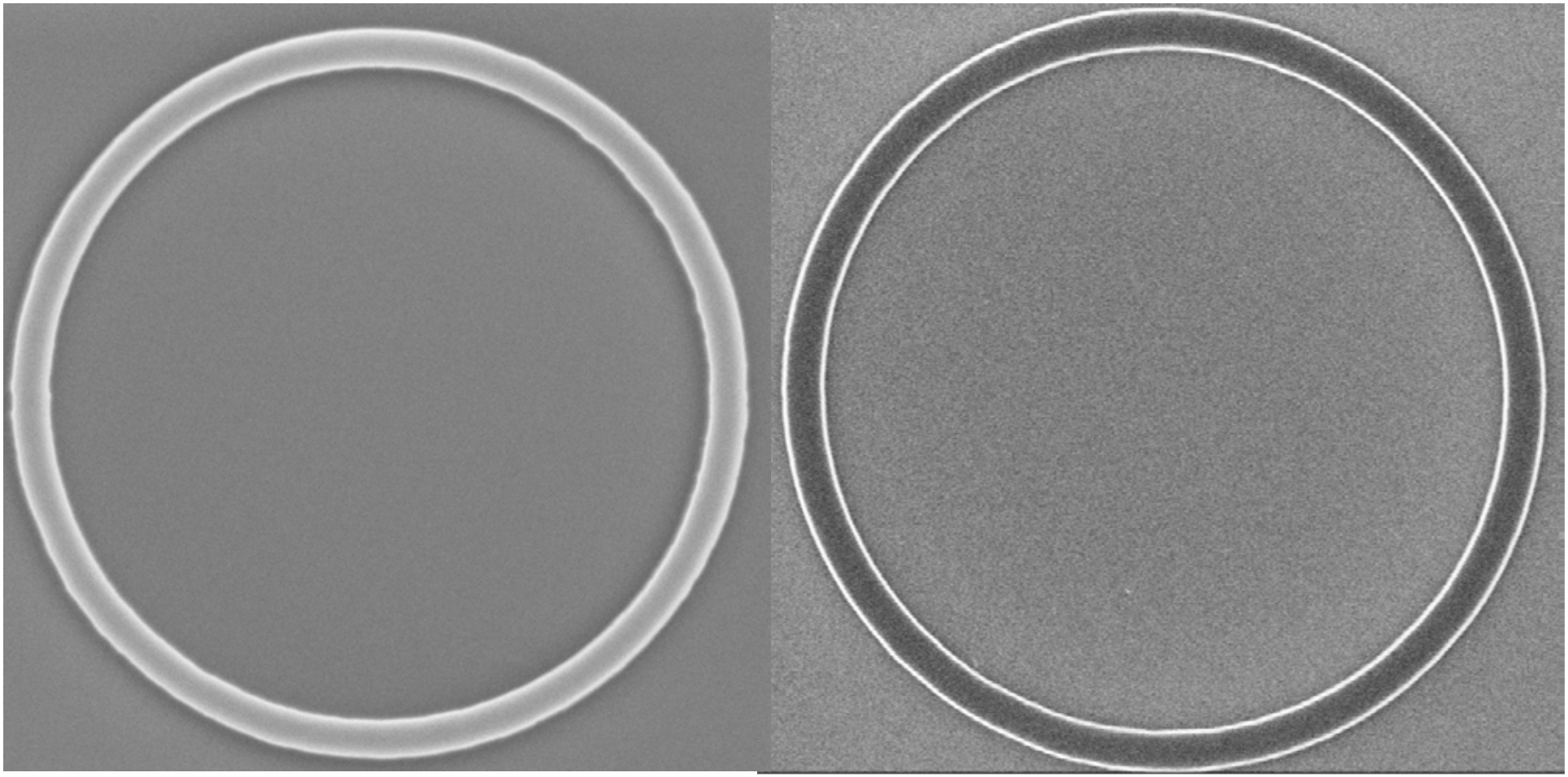
Argonne

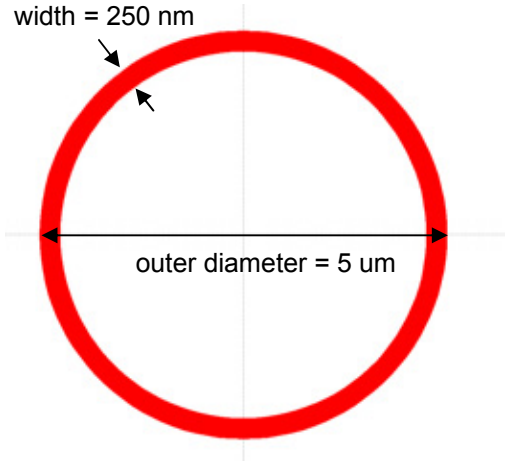


Dose = 10,000 uC/cm2

Ga Tech

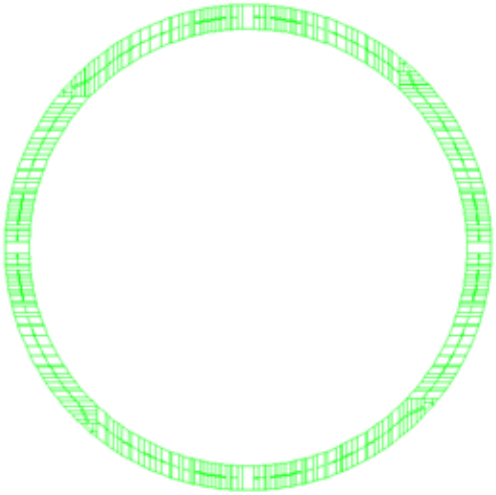
Argonne





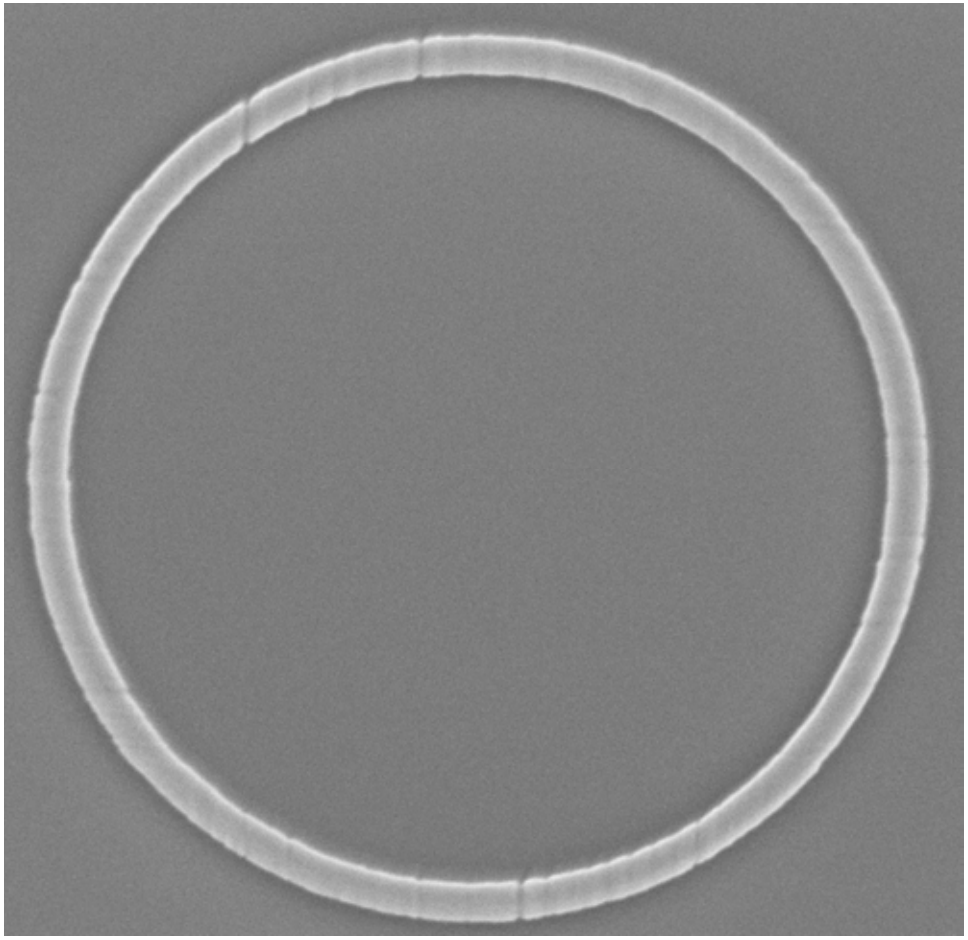
conversion 4

hsqcircleLB2.v30, Layout BEAMER, shot pitch fracturing, pattern units = 1 nm, shot pitch = 2 nm, fracture mode 1, center to field



Dose = 1500 uC/cm2

Ga Tech



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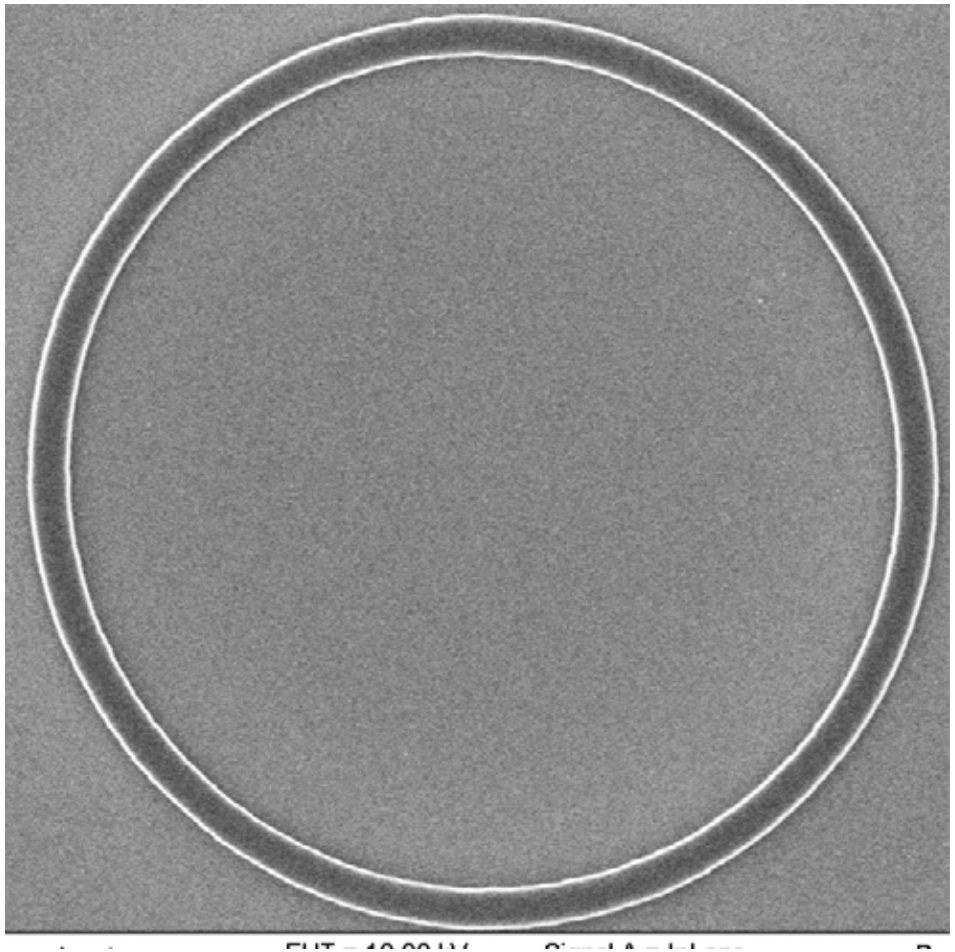
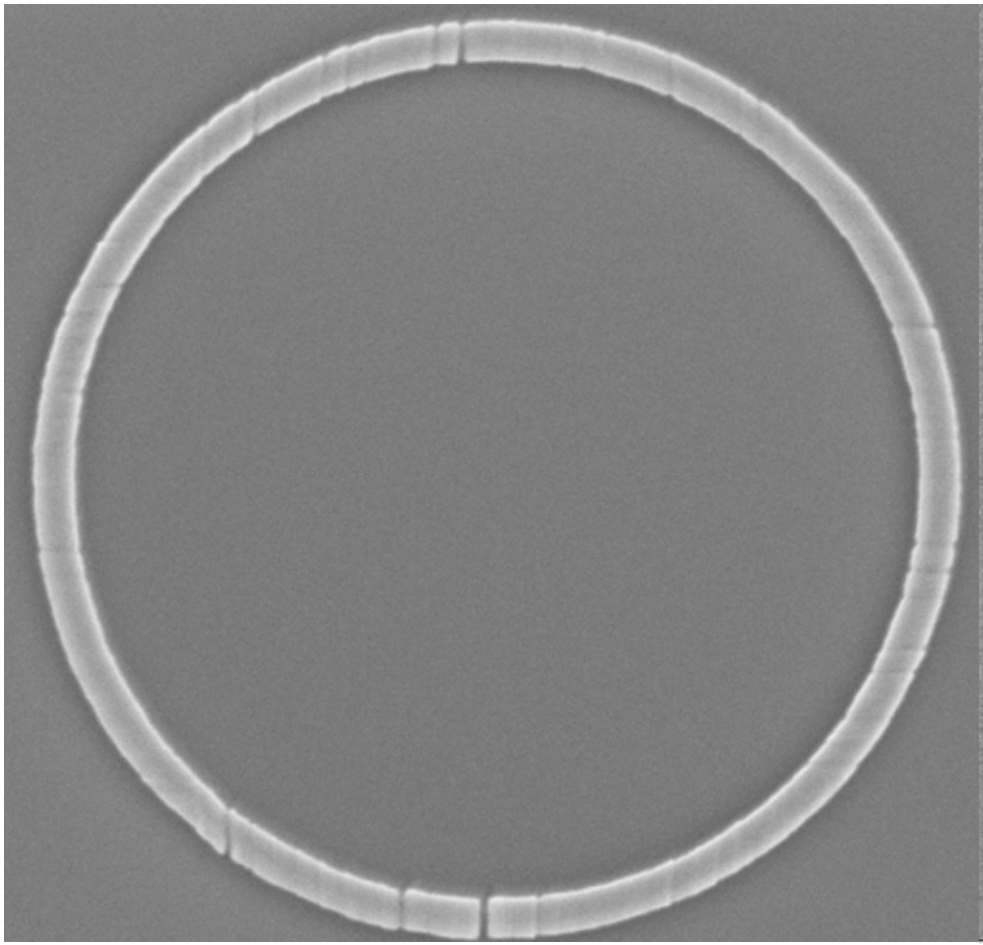
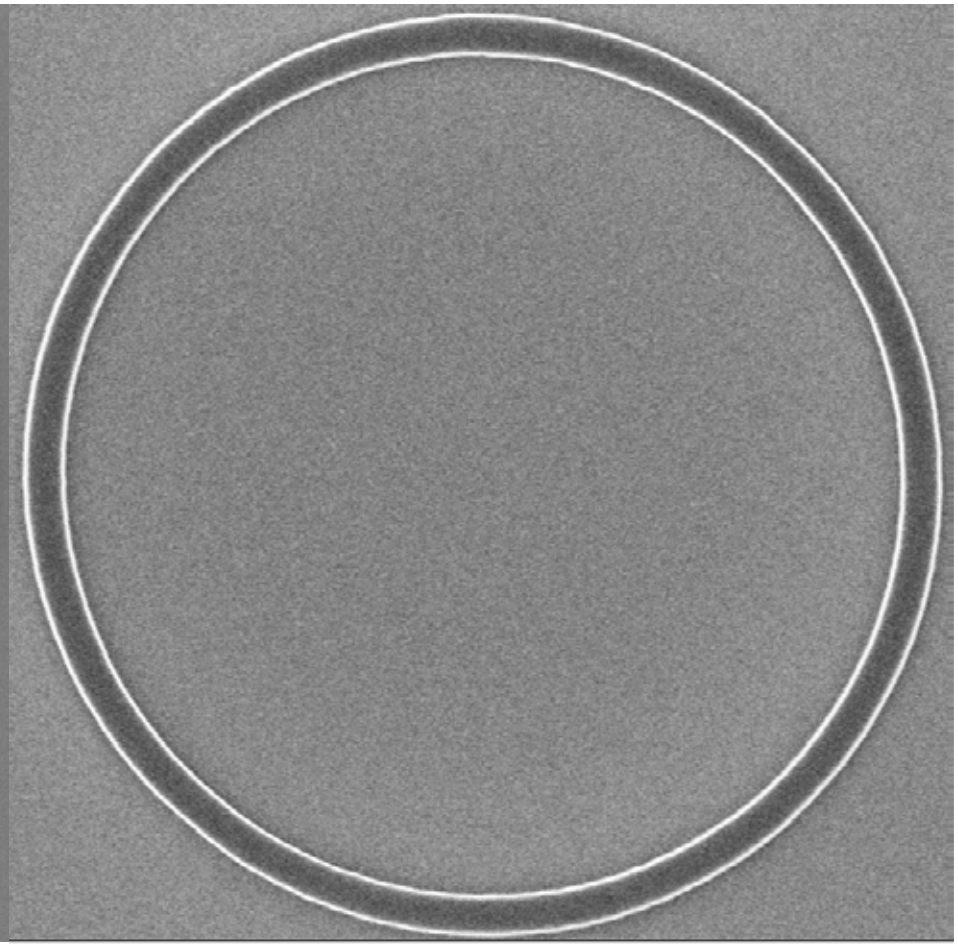


Dose = 3000 uC/cm2

Ga Tech

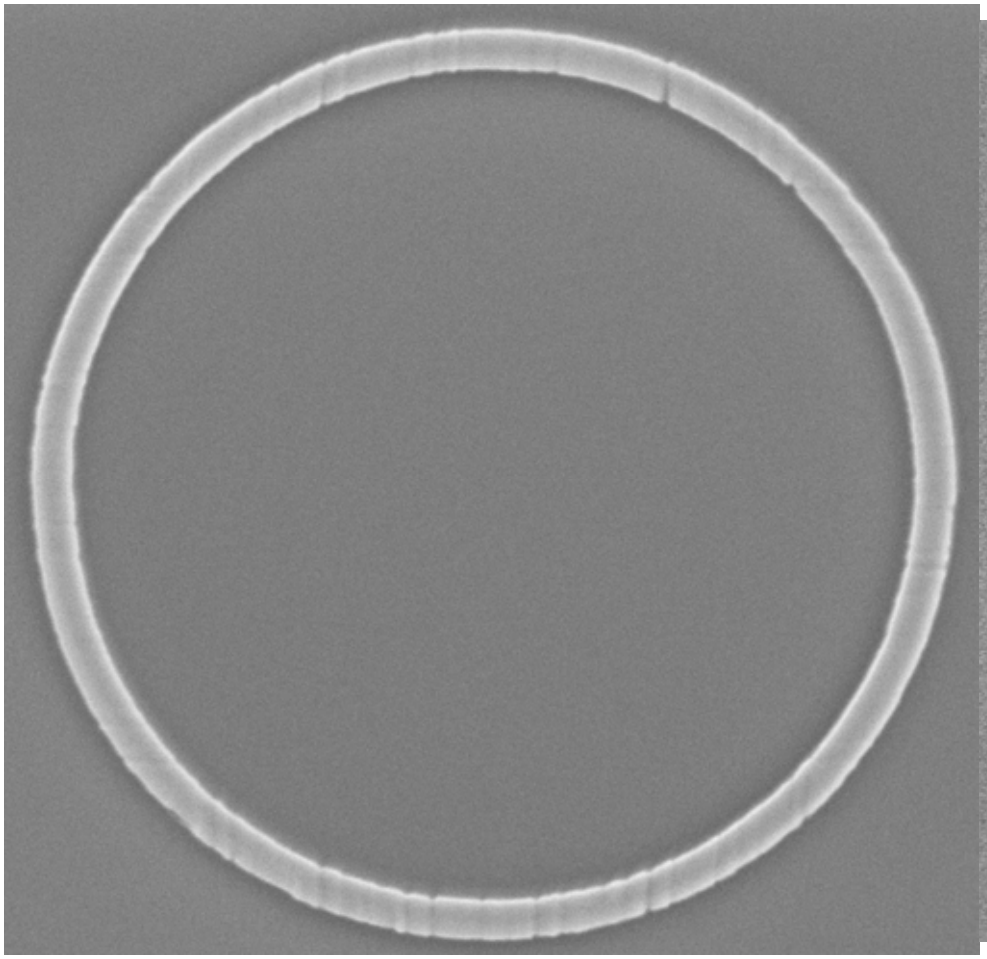


Argonne

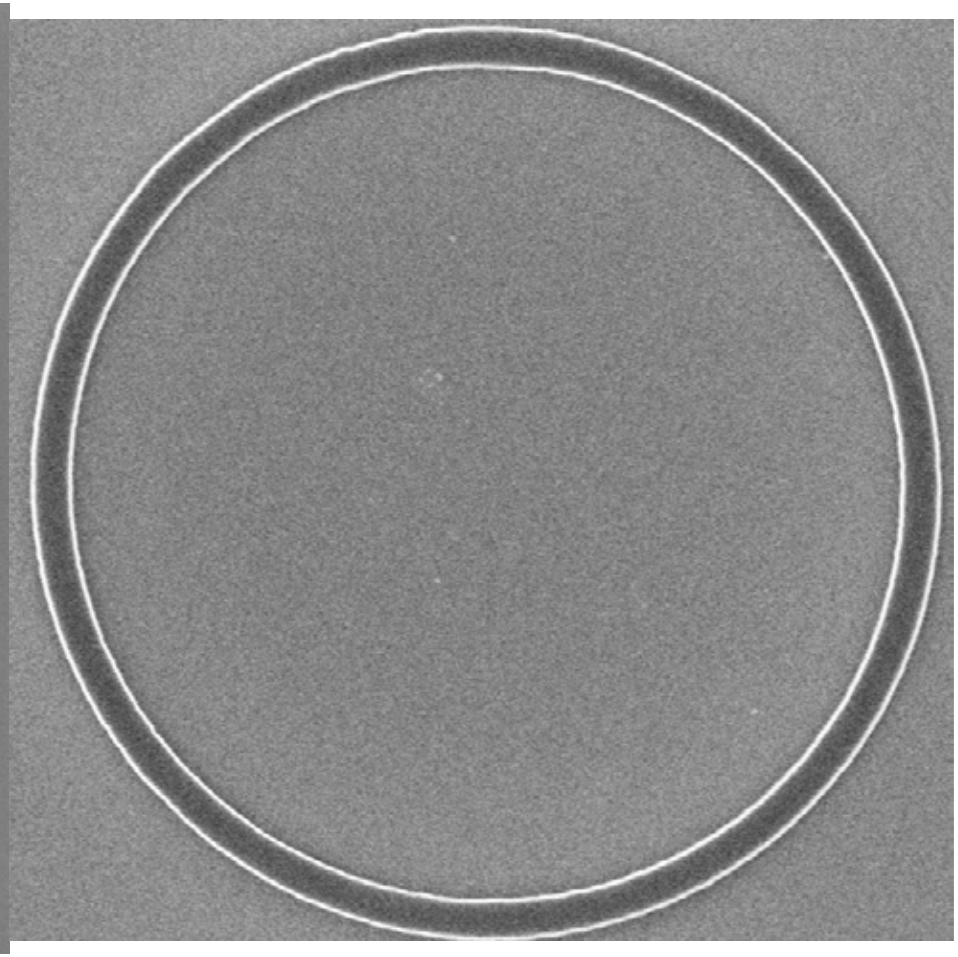


Dose = 5000 uC/cm2

Ga Tech

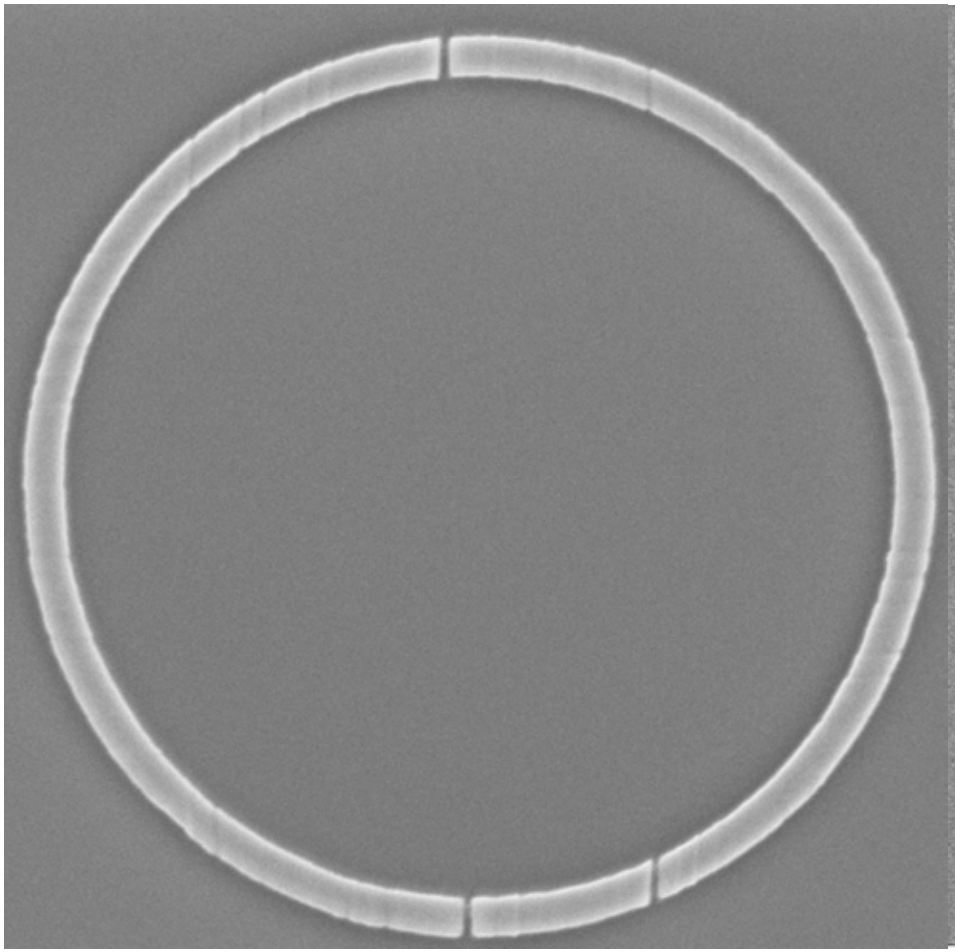


Argonne



Dose = 10,000 uC/cm2

Ga Tech



Argonne