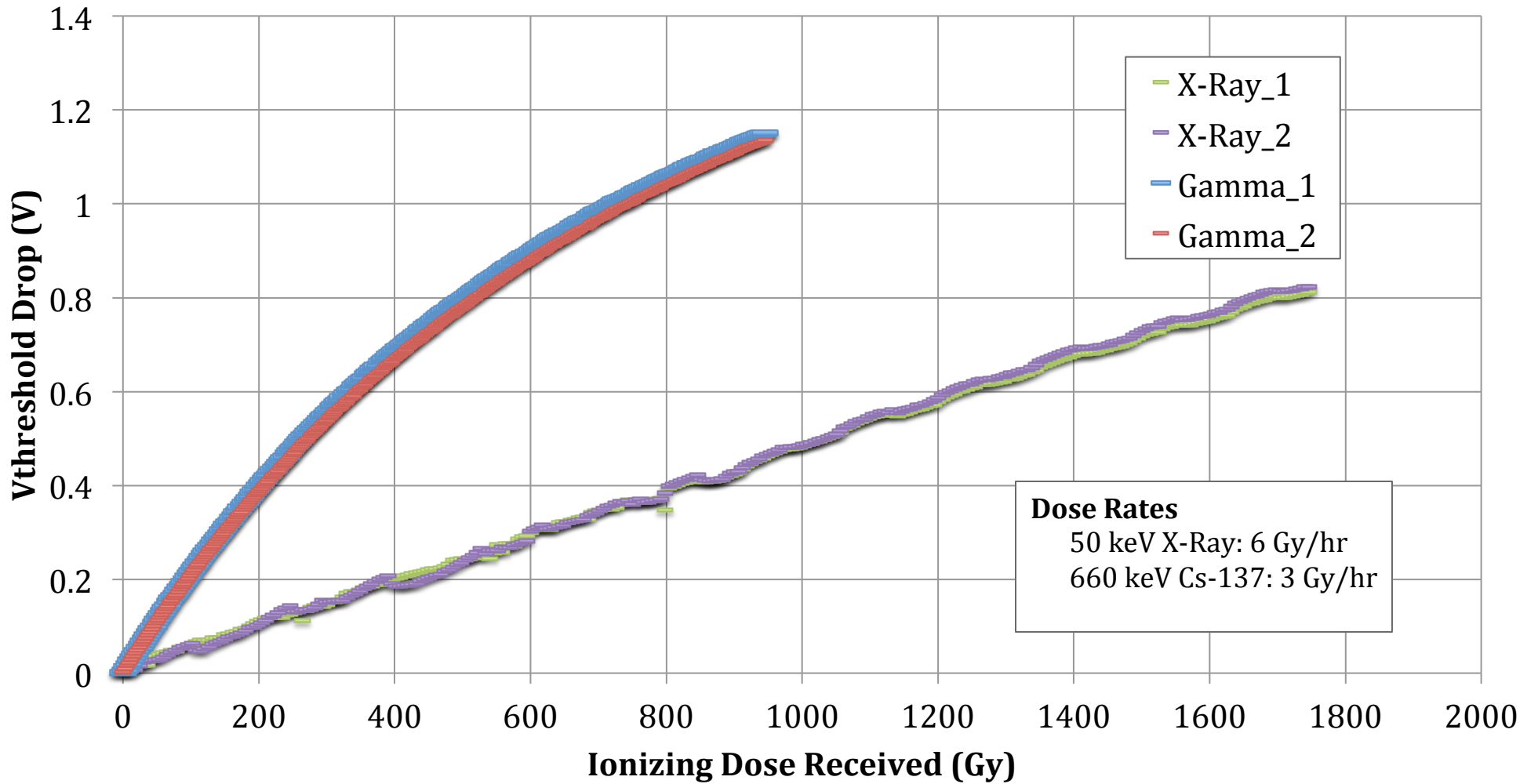
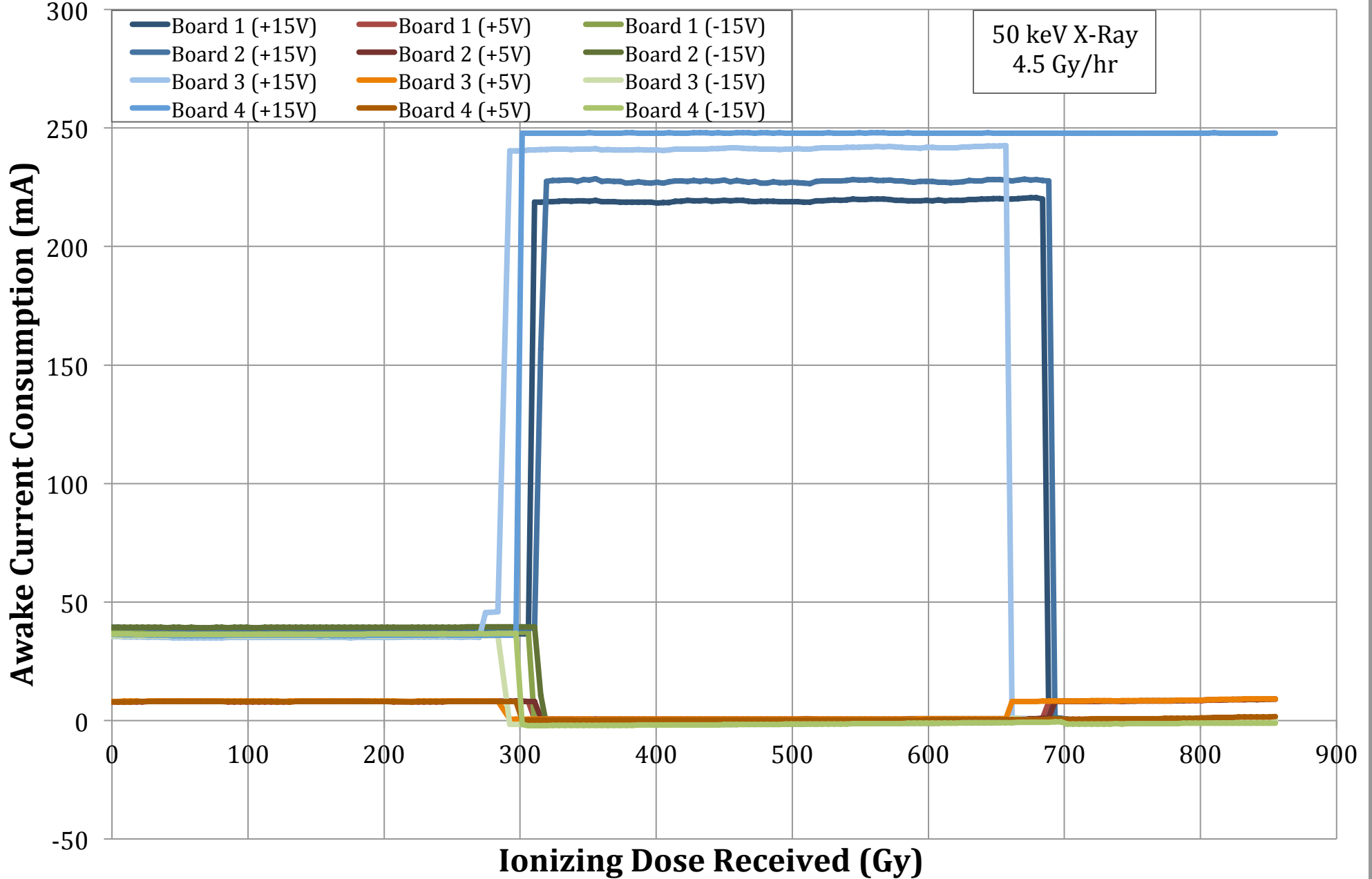


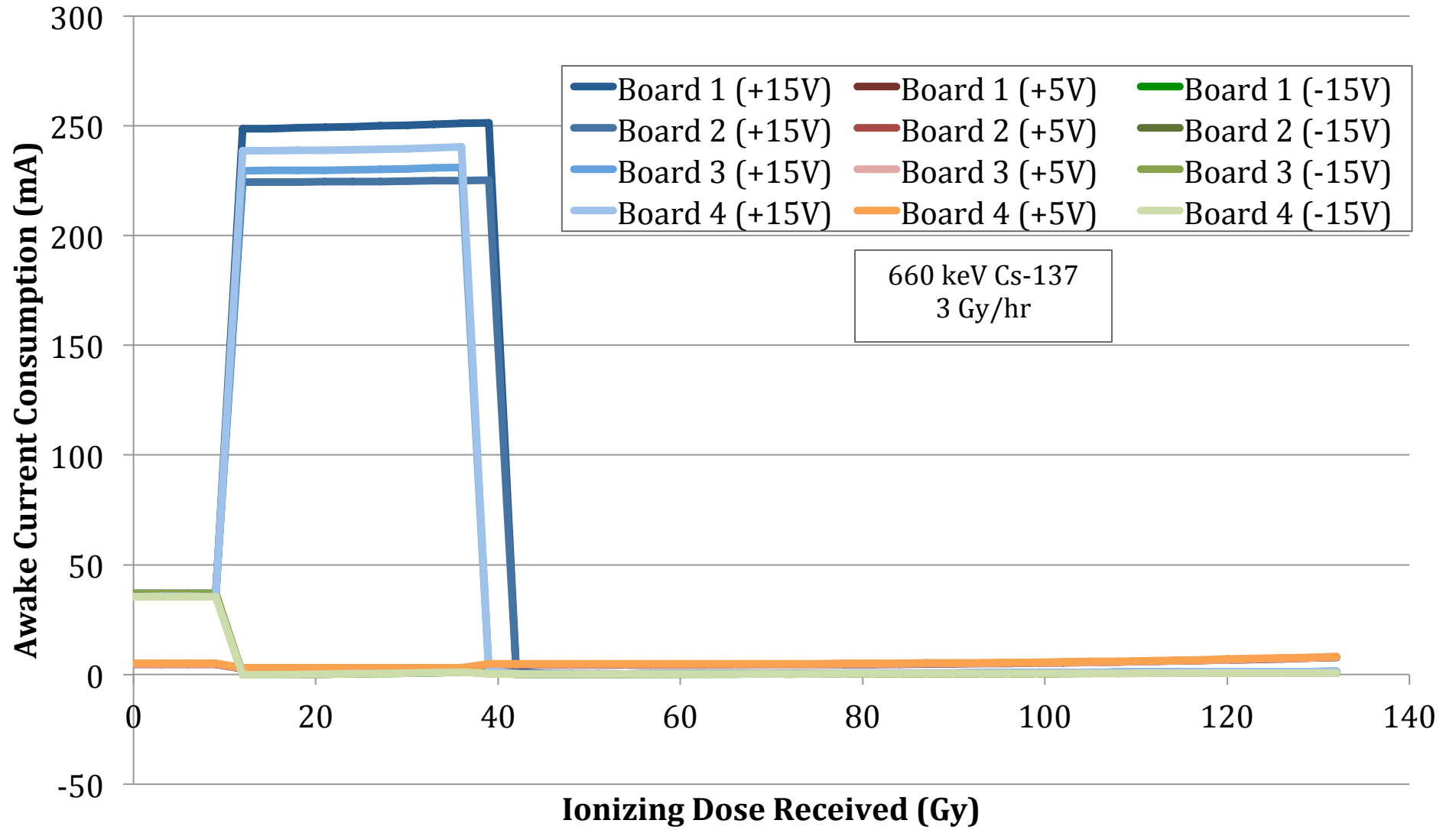
# NDS355AN Vth Drop vs. Ionizing Radiation (Cs-137 and X-Ray)



# A2036 Awake Current Consumption vs. X-Ray Ionizing Radiation



# A2036 Awake Current Consumption vs. Cs-137 Ionizing Radiation



## Radiation Damage in Silicon Devices

### Surface Damage:

Accumulation of charge at Si-SiO<sub>2</sub> interface

Low energy x-ray irradiation

### Bulk Damage:

Si particle knocked out of SiO<sub>2</sub> lattice structure by energetic particle

Have seen this with neutron radiation

### Points Defects:

Single atom displacement (Frenkel pair)

$E_{\text{neutron}} > 185 \text{ eV}$

$E_{\text{electron}} > 255 \text{ keV}$

### Defect Clusters:

Displaced Si atom has enough recoil energy to knock out others

$E_{\text{neutron}} > 35 \text{ keV}$

$E_{\text{electron}} > 8 \text{ MeV}$

## Sources

<http://delphiwww.cern.ch/~collinsp/detectors/mmoll.pdf>

[http://meroli.web.cern.ch/meroli/lecture\\_radiation\\_damage\\_silicon\\_detector.html](http://meroli.web.cern.ch/meroli/lecture_radiation_damage_silicon_detector.html)

<https://cds.cern.ch/record/2038628/files/245-263-Todd.pdf>