# Difficulties in Calibrating an Accurate Sensitive Volume Model

1. I do not have complete agreement between experimental and simulation results
   1. Results are low for <Vdd/2 and conservative for >Vdd/2.
   2. I am using a simple approximation of critical charge
      1. Ignores restoring feedback of the SRAM cell
      2. Feedback is bias dependent and is more important with increased supply voltage
   3. I am using a *simple* sensitive volume geometry assumed from dimensions of the ITRS roadmap SRAM cell area (area x depth)
      1. This is in reality a bias dependent problem – SV geometries in reality *should* scale with applied bias
         1. Increased SV area would increase the CS/ER
      2. Ignores diffusion transport of charge contributing to collection
         1. This is likely to determine the sensitive volume geometry
      3. Ignores charge collection efficiency
         1. This is a bias dependent process
      4. Assumed well-depth
         1. Increase in well-depth would result in a larger CS/ER

All of the assumptions inherent to the chosen SV geometry and Qcrit make a accurate bias dependent model of electron-induced SEUs in a 45 nm SRAM a difficult prospect.

Without extensive effort, readily available SEU data, and process details, it is difficult to simultaneously calibrate a bias dependent sensitive volume geometry, charge collection model, and critical charge parameters to achieve an exhaustive model of SRAMs in any technology node.