TCR True TRISO Particle Distribution

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- The DOE-NE Transformational Challenge Reactor (TCR) program has developed a new method to construct TRISO-filled fuel elements.
  - Current TCR fuel elements are cog-shaped
- Particle packing is very dense, ~60% packing fraction
- Test fuel elements are constructed using 3D printed shell, surrogate particles are then poured into the empty shell.
- The test fuel elements are then scanned using X-ray computed tomography (XCT). The data from these XCT scans are then post-processed to yield TRISO particle centroid locations
- Centroid locations are then used to build a model of the as-built fuel element using KENO geometry and run using SCALE/Shift.
- **Big takeaway – particle packing is NOT random!**
  - Impact on power distribution and fuel element stresses