

Sr-90 Scanner for Scintillator-Cell uniformity Tests

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Scintillator Cells



- Turns particle's energy into light
- Light radiates outward to SiPM
- 3 variables effect SiPM energy
 - particle energy
 - distance traveled
 - \circ amount of material particle passes through

- SiPM reads different energy based on distance
- Add reflective foil to keep light in cell
- Create dimple to offset distance effects



Scanner Design

- Objective: create a setup to measure uniformity of cells and layers. This will be used for prototyping and to test layers before assembling
- Shoot particles perpendicular to cell
- Use step motors to move beam
- Compare measured energy at each point



LED Tests

- Used LEDs for the beam
- Known light intensity
- Can't fully cover cell in foil
- Able to show cross-talk in connected cells



Sr-90 Scanner

- Radioactive Isotope Emits β⁻ radiation
- Can penetrate reflective foil
- Distribution of energies
- Select for minimum ionizing particles
- Only record data when bottom cell gets signal







Collimator

- Selects for electron direction
- Brass tube
- 3D print object to connect source, collimator, and motor





What Next?

- Check current uniformity
- Test different cell shapes/sizes as well as dimple shapes

The End