

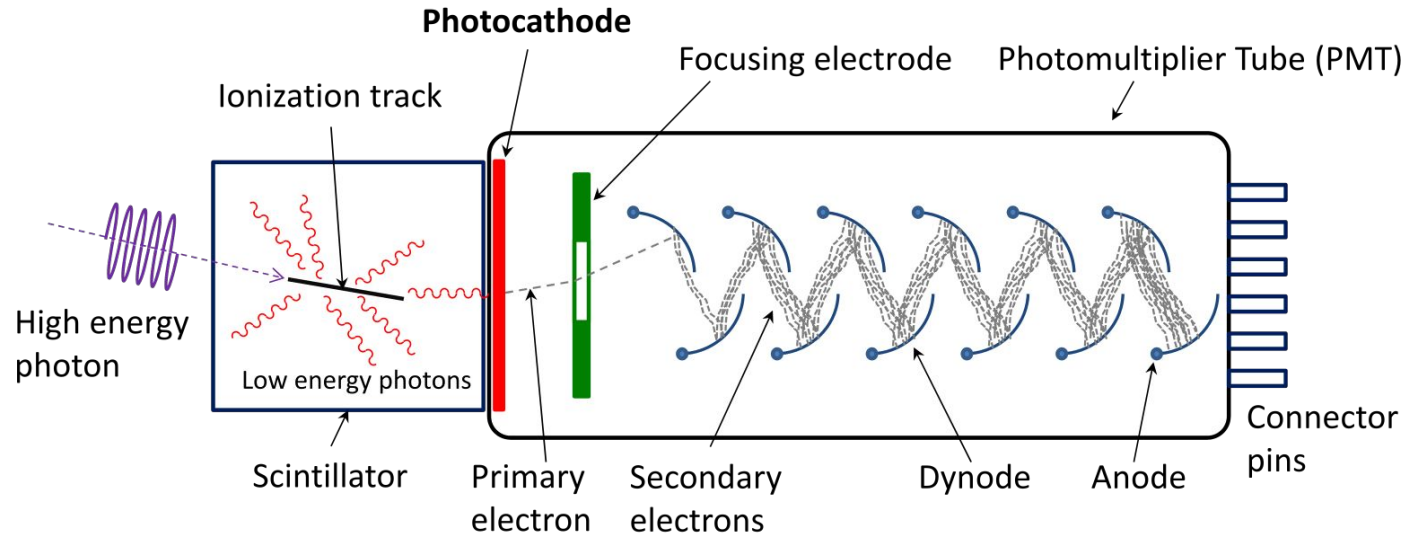


Scintillators & Lead Tungstate Crystals

Ethan Nguyen

What are scintillators?

- Instrument that detects and measures ionizing radiation



Credit: Wikipedia



Why Lead Tungstate (PWO) crystals?

- Lead Tungstate crystals are ideal for electromagnetic calorimeters
 - Small Moliere radius → Short Radiation length → High stopping power
 - Higher light yield than other crystals
 - High radiation hardness
- HOWEVER, crystal qualities vary (e.g. optical transmittance)

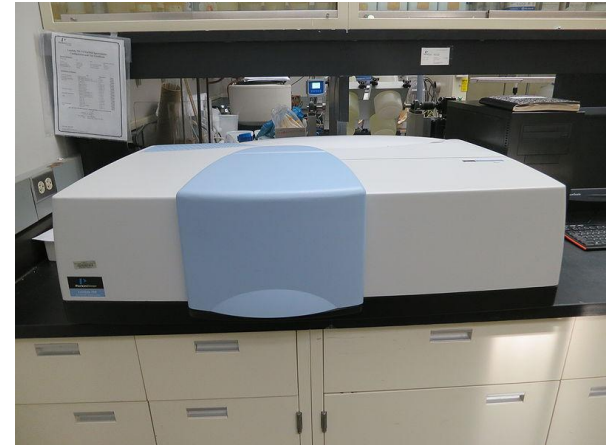


Why is optical transmittance important?

- Lower optical transmittance → Lower light yield → More noise (in data)

How can we COLLECT data for optical transmittance?

- Spectrometer Lambda 750
 - Stepper motor → Transverse Optical Transmittance measurement



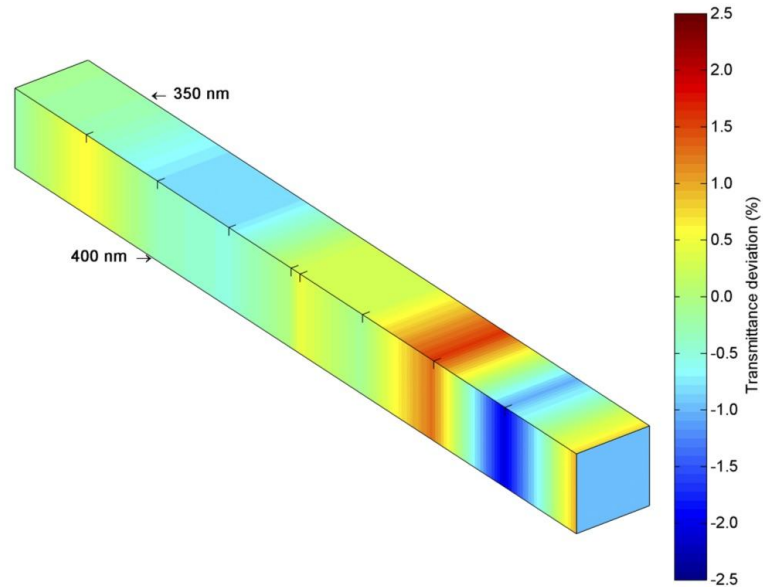


How do we ANALYZE the data?

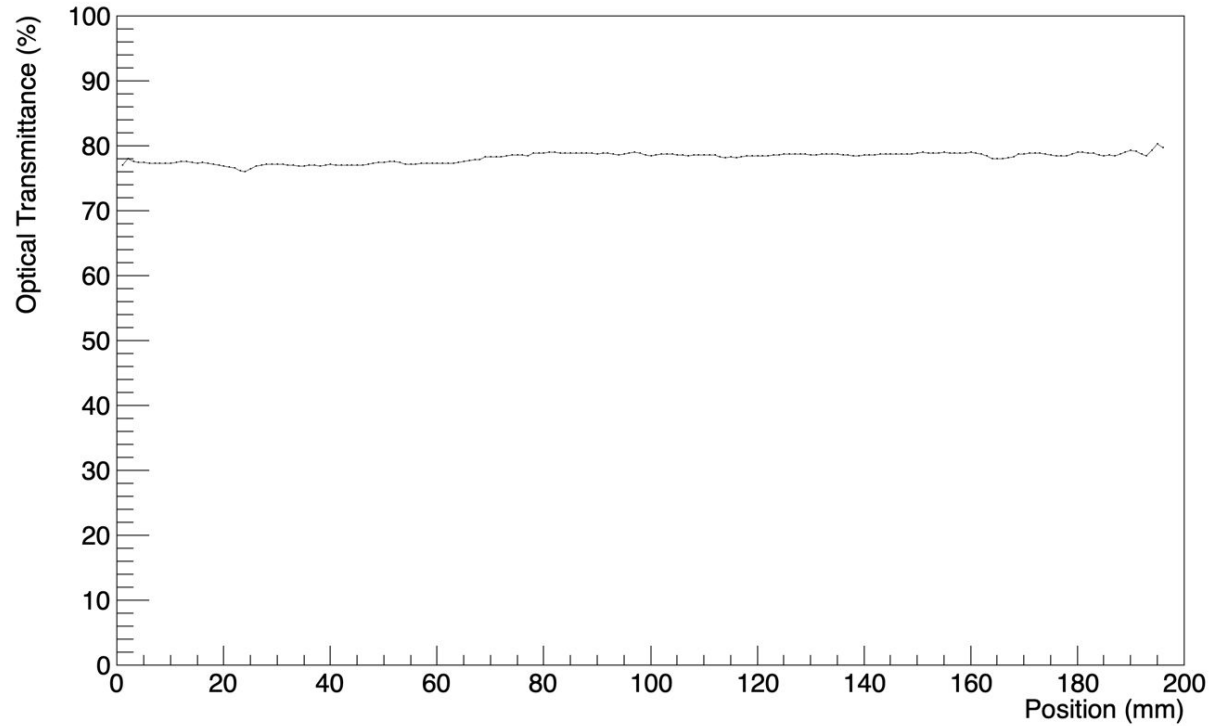
- ROOT
 - Ideal for analyzing large data sets (trees)



Goal: Learn ROOT

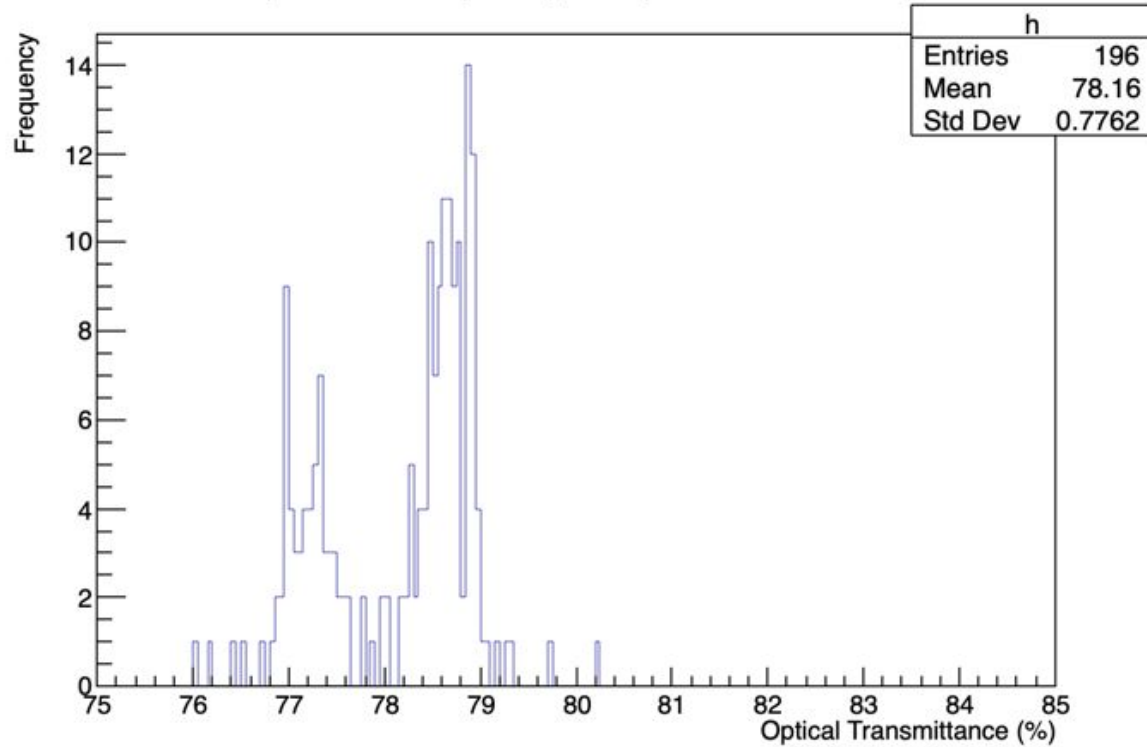


Sample 72 - Position vs Transverse Optical Transmittance



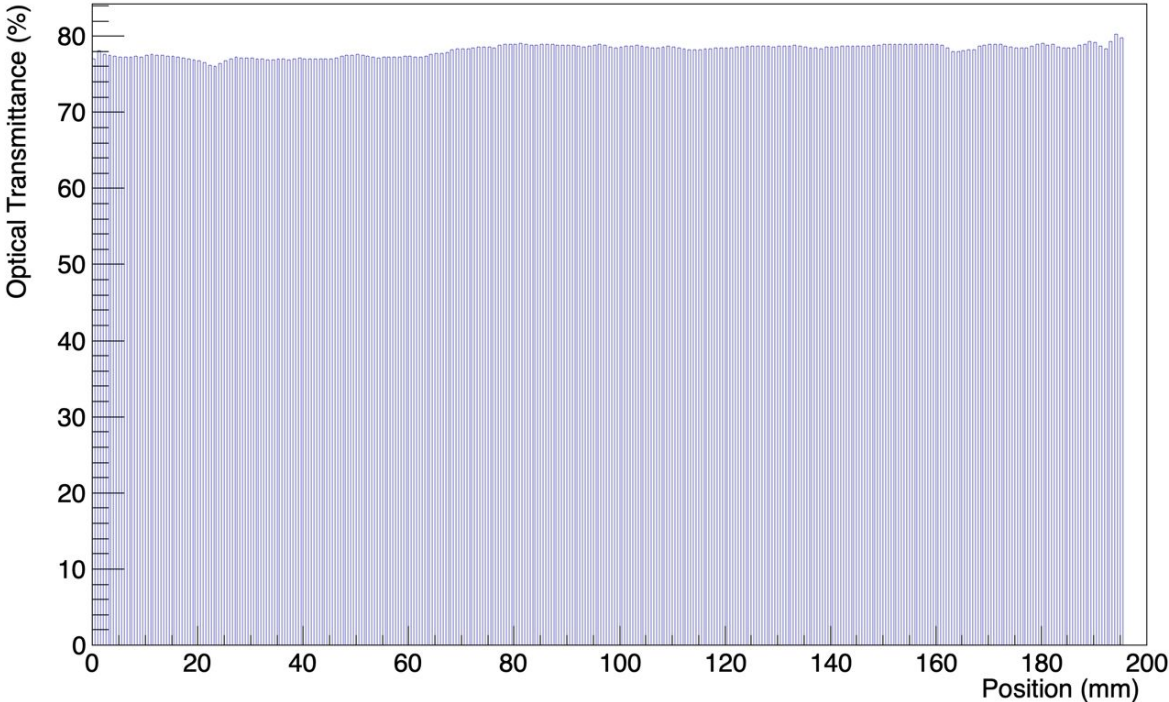


Sample 72 - Frequency of Optical Transmittance



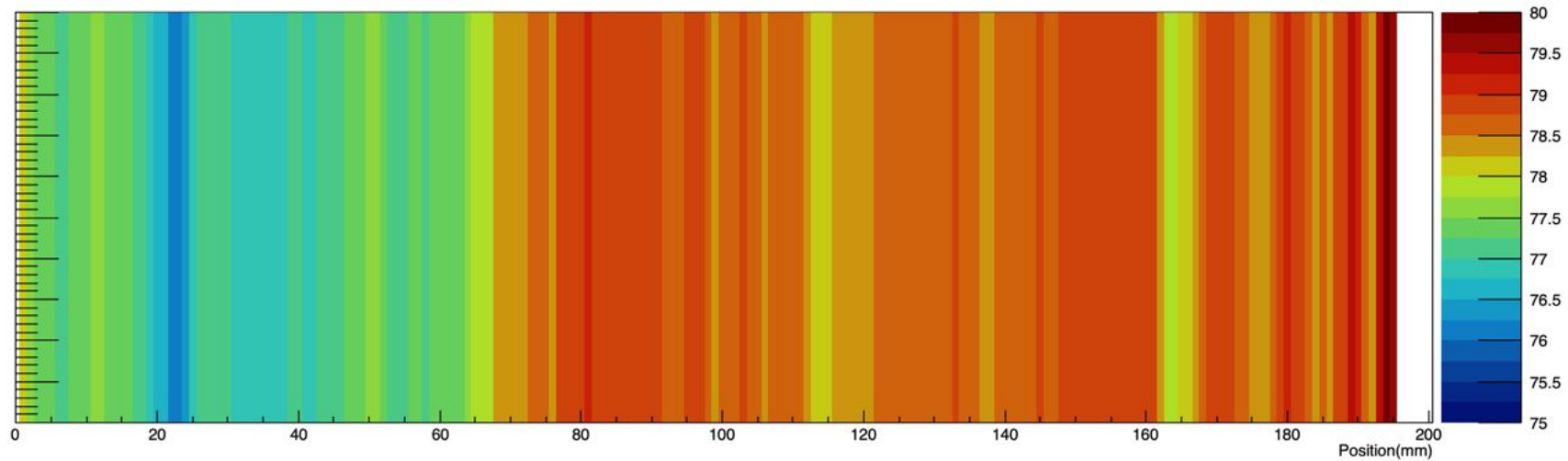


Sample 72 - Position vs Optical Transmittance





Sample 72 - Position vs Optical Transmittance





What are my goals for next week?

- Finish heat map of crystal
 - Calculate deviance for optical transmittance
- Measure transverse optical transmittance for additional crystals
- Learn analysis scripts for kaonLT data