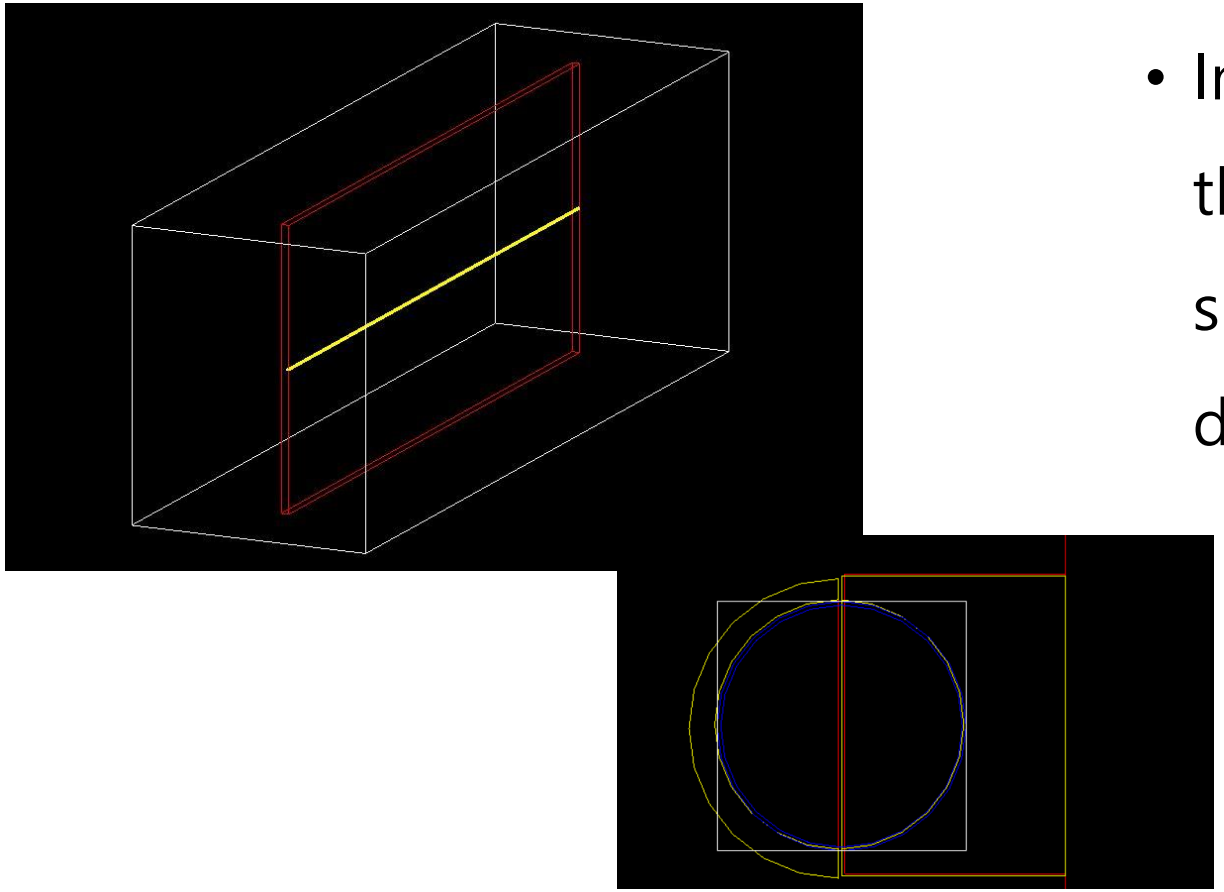
DCV Simulation

최재민

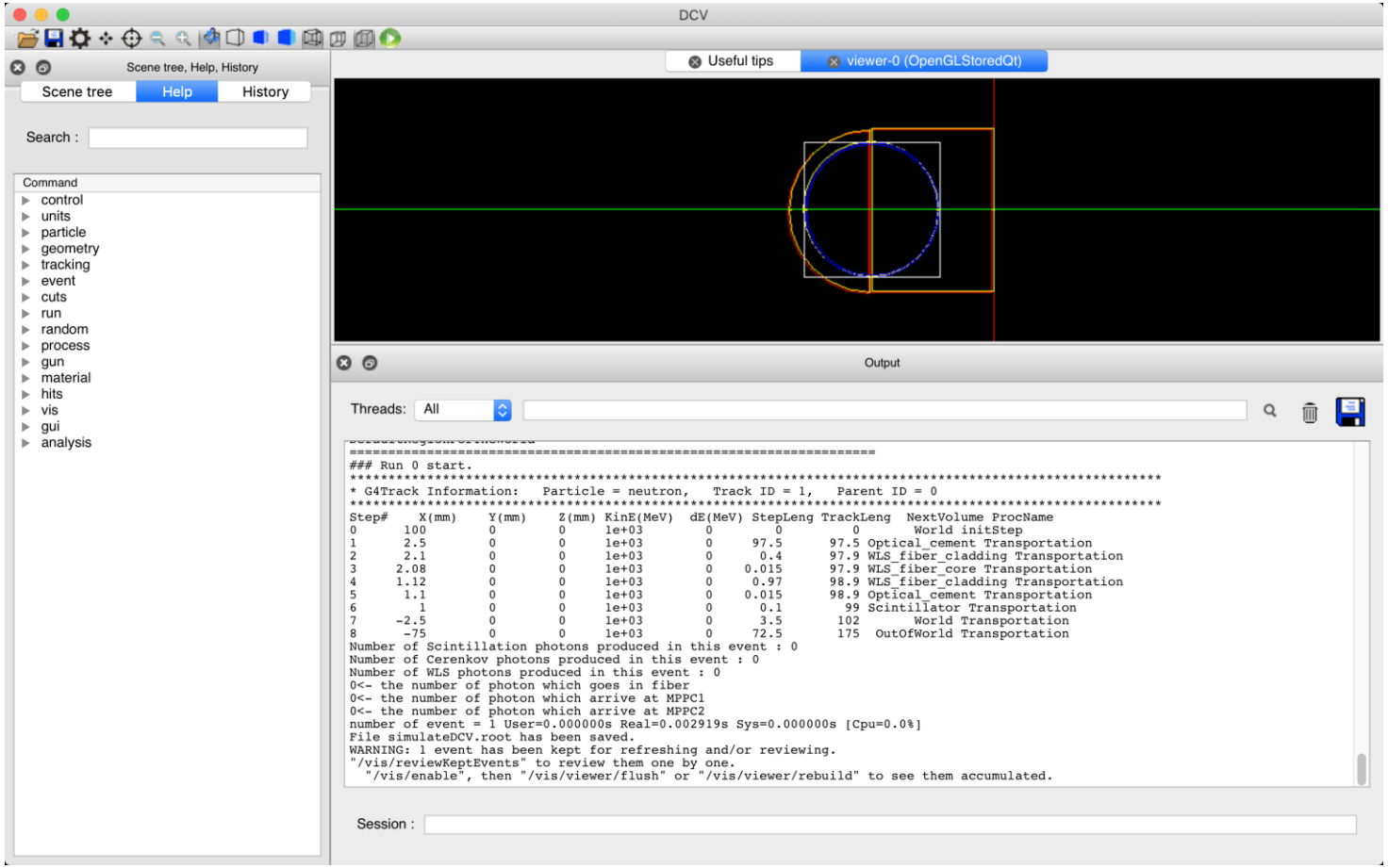
Geometry Test



- Figure of enlarged fiber section

- In visualization, it can be seen that there is a gap between two slide, tub and box which are drawn in yellow color.

Geometry Test



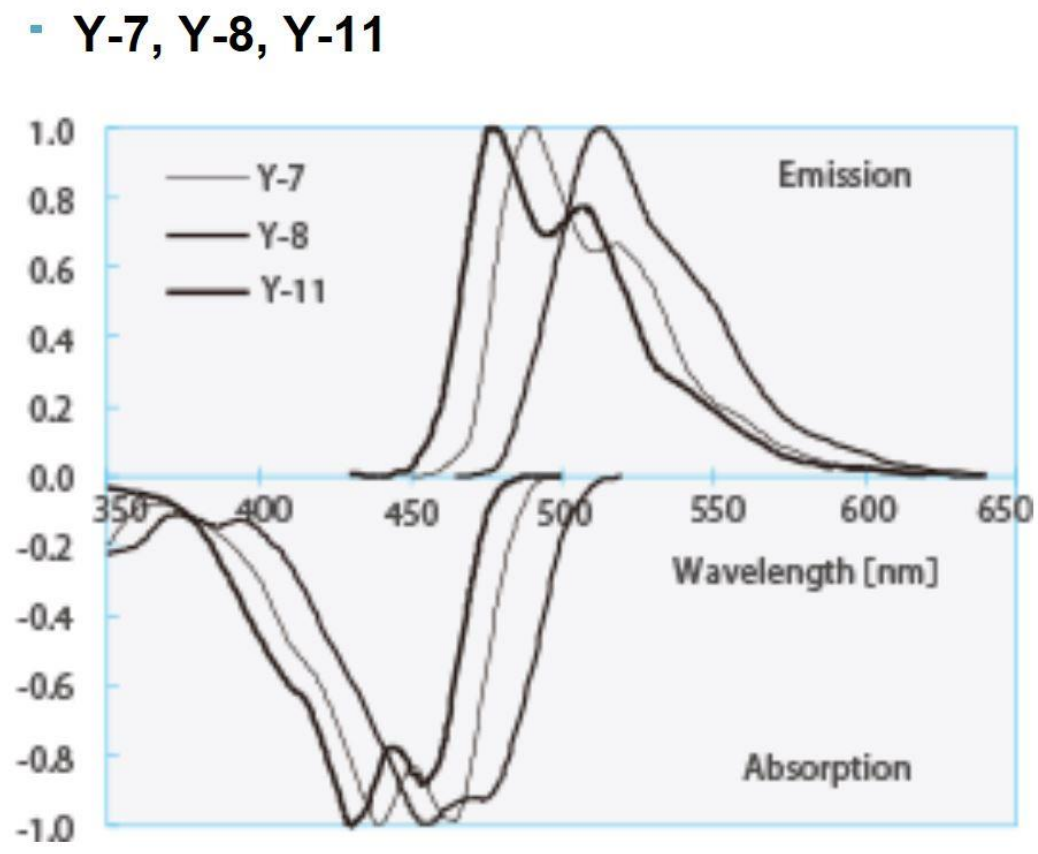
- By shooting neutron, we can see where the neutron passes.
- And we can confirm that there is no gap between the two solids.

WLS Process Test

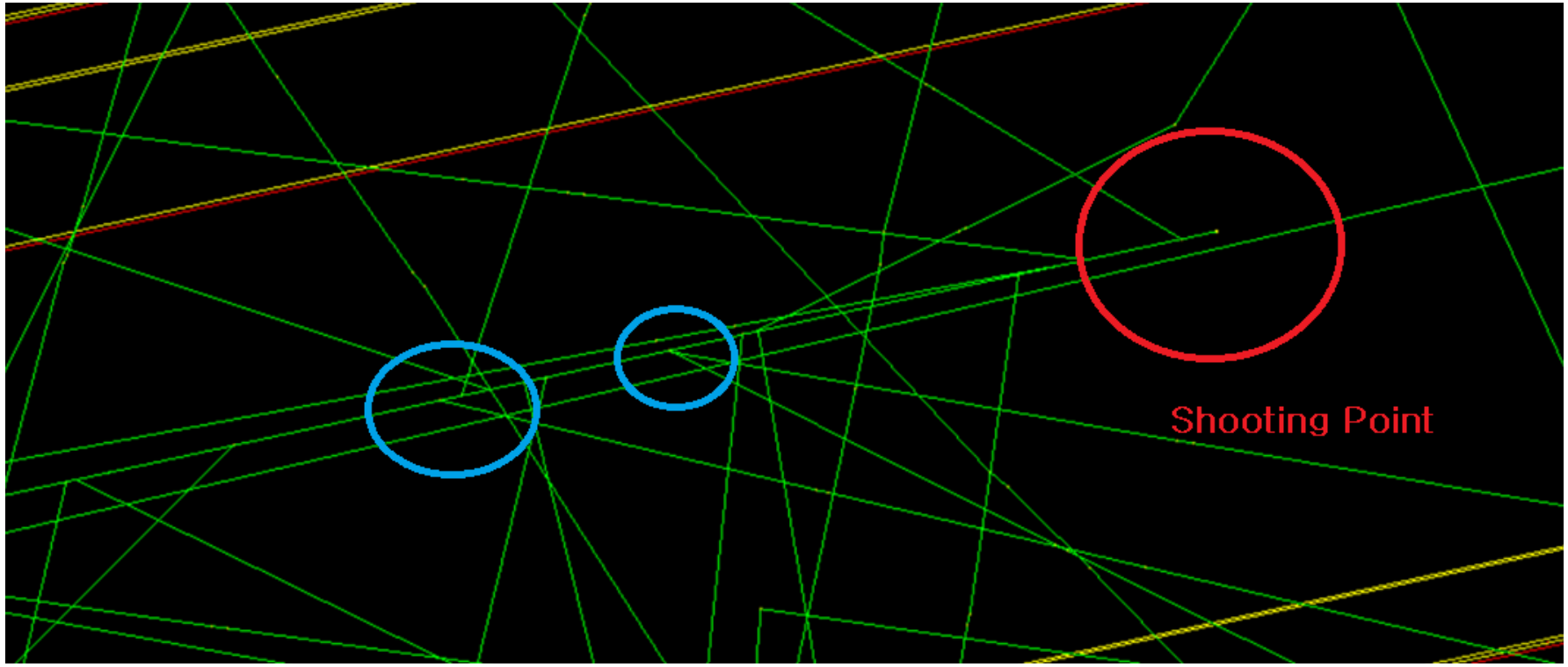
- WLS Process consists of two process. One is absorption, and the other is emission.
- Absorption process is the process by which electron absorbs light and be excited.
- Emission process is the process by which electron emits the photon and be stable.

WLS Process Test

- First of all, to check that emission process works well, we shot photons of 430nm wavelength.
- In order to see the exact emission wavelength, it is necessary to emit light that is larger than the minimum emission wavelength.
- We can get the wavelength of photon produced in WLS fiber by making use of sensitive detector of WLS fiber.



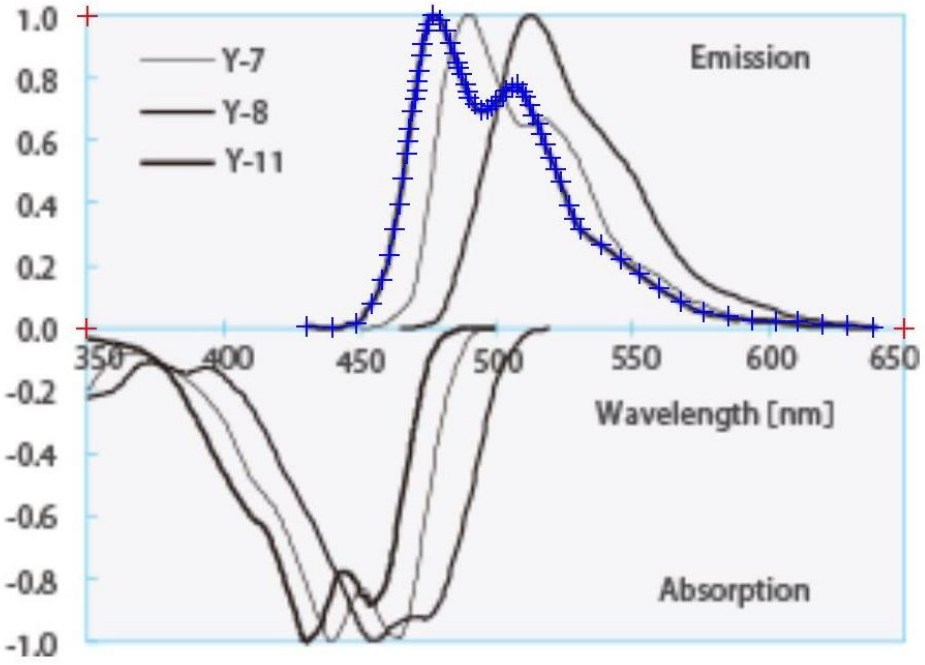
Result of Visualization - Emission



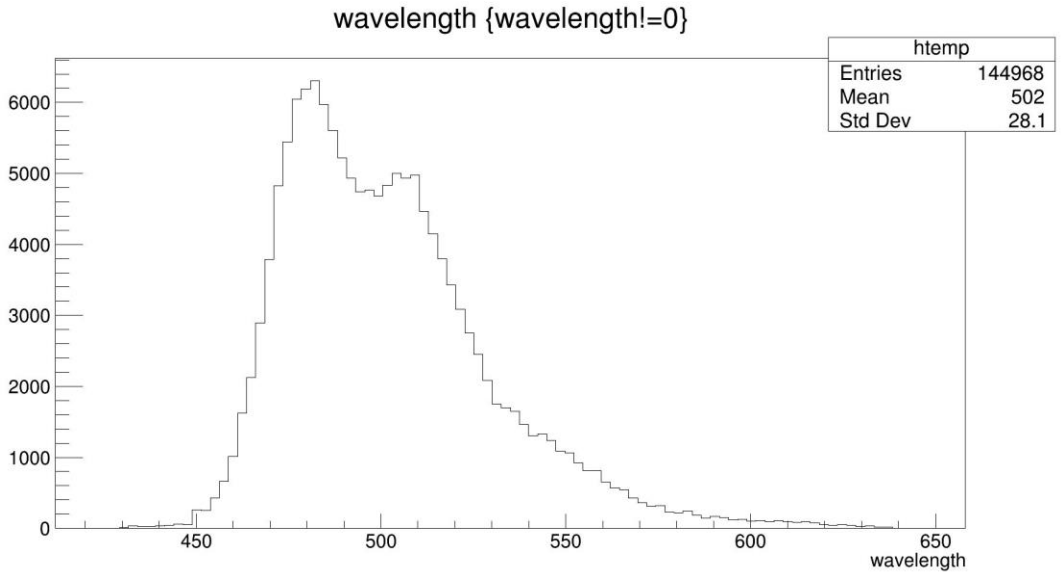
- There are photons which are traveling in the opposite direction to the shooting direction.

WLS Process Test - Emission

- **Y-7, Y-8, Y-11**



- Figure of Emission spectra of Y-11 fiber(blue line)

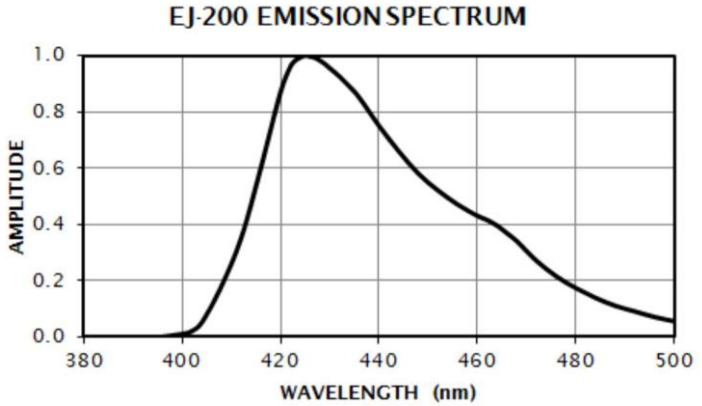


- Figure of wavelength of photons produced OpWLS Process

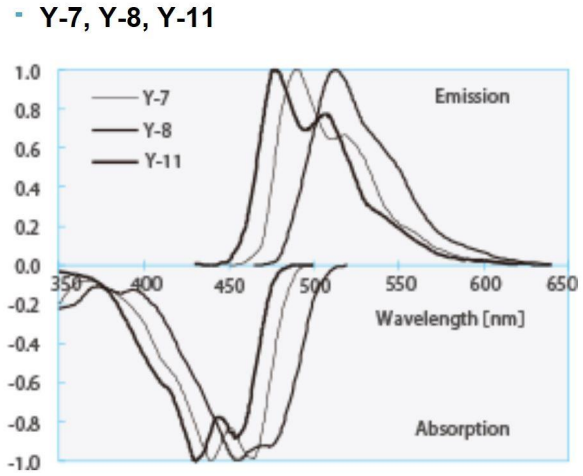
- By comparing wavelength graph with emission spectra, we can confirm that OpWLS emission process works well.

WLS Process Test - Absorption

- To test absorption process in WLS process, we shot $\pi^+$with 1 GeV to scintillator.
- Scintillator emitted photons by scintillation process with energy deposited by π^+.
- And WLS fiber absorbed photons based on absorption spectra.
- For these reasons, to understand absorption spectrum, both two factors need to be considered.
- To distinguish absorbed photons, we used 'aTrack -> GetTrackStatus == fStopAndKill' Geant4 code.

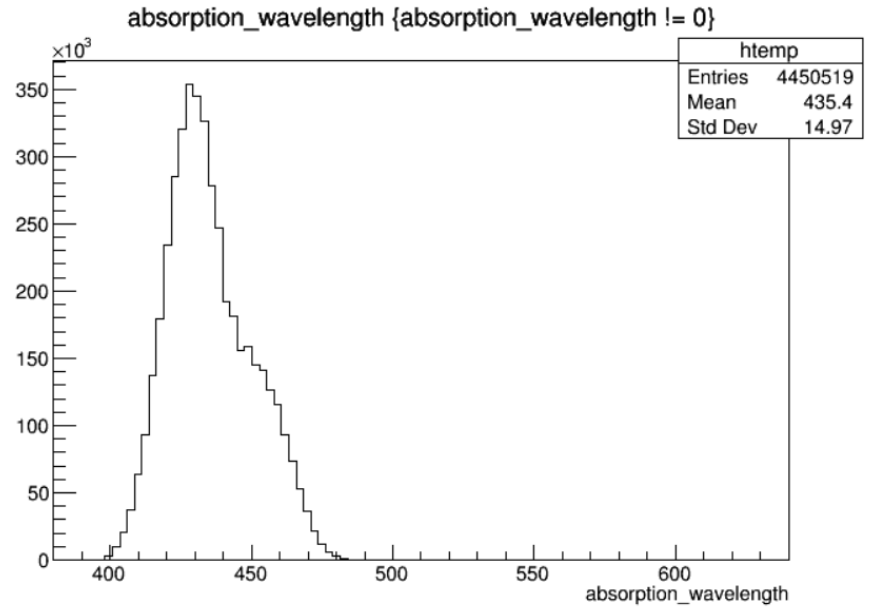


- Figure of Emission spectra of EJ-200 Scintillator



- Figure of Absorption spectra of Y-11 fiber

WLS Process Test - Absorption



- Figure of Absorption spectra considered two factors
- Figure of wavelength of photons absorbed OpWLS Process