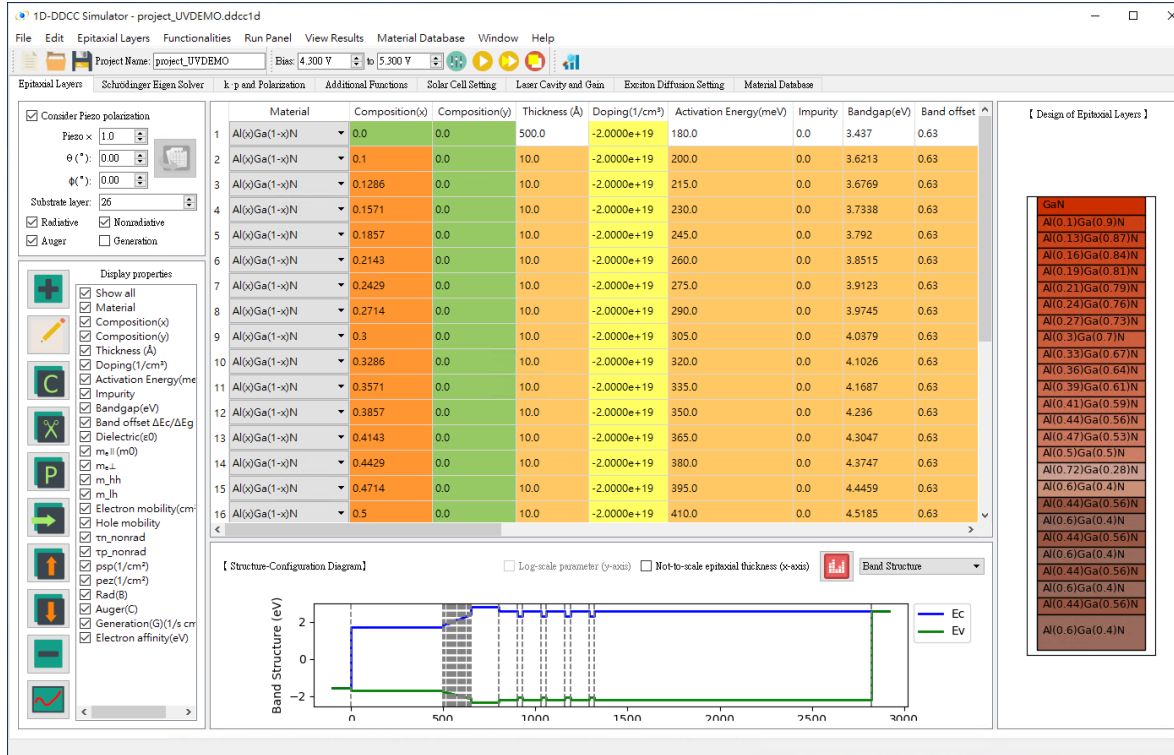
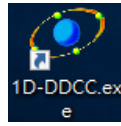


# Project Demonstrations

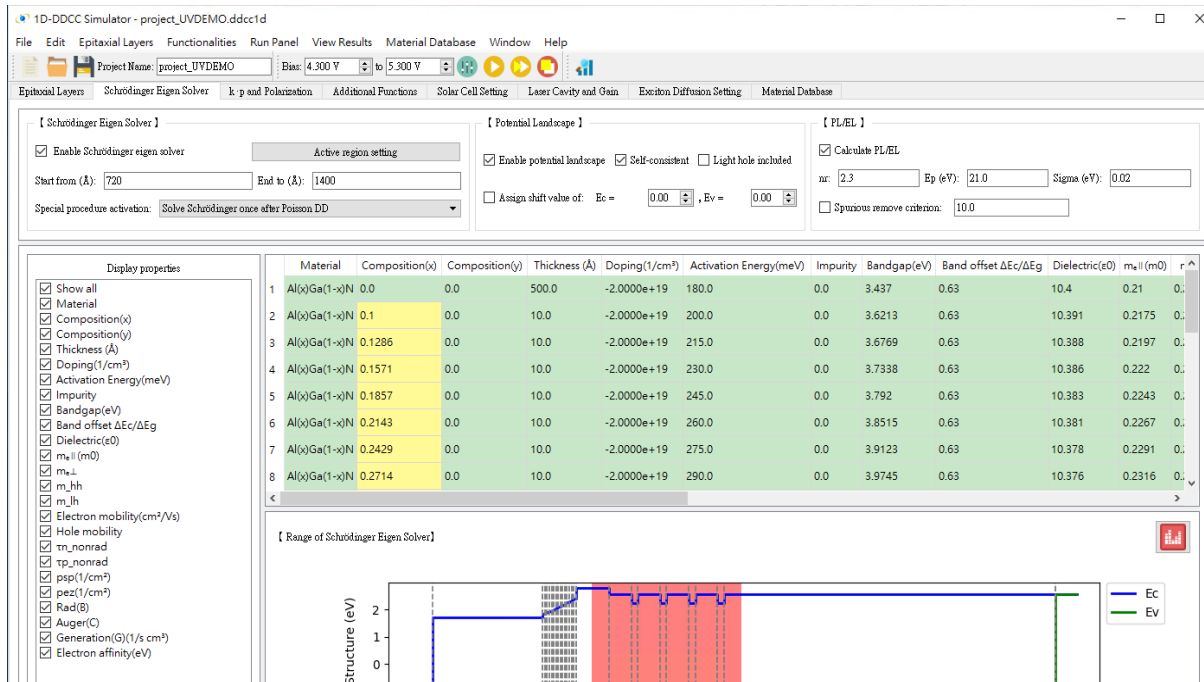
Below are the sample screenshots of the GUI software which I developed.

## (1D) TCAD Software Demo

### 1. Tab of epitaxial layers setting



### 2. Tab of Schrodinger solver setting



### 3. Tab of laser cavity simulation

1D-DDCC Simulator - project\_1.ddcc1d

File Edit Epitaxial Layers Functionalities Run Panel View Results Material Database Window Help

Project Name: project\_1 Bias: 3.500 V to 4.000 V

Epitaxial Layers Schrodinger Eigen Solver k-p and Polarization Additional Functions Solar Cell Setting Laser Cavity and Gain Exciton Diffusion Setting Time Dependent Module Material Database

**[ Laser Cavity Setting ]**

Onset of the DDCC layers: 18

Wavelength (nm): 450.0

ds (Å): 2.0

Total thickness (Å): 10200.0

**[ Edge Emitting Laser ]**

☒ Calculate cavity mode Length of laser diode: 1000.0

☐ Only solve cavity mode Left reflectivity: 0.500

☒ Calculate cavity gain Right reflectivity: 0.500

**[ Gain ]**

☒ Calculate intrinsic gain ☒ Coupling of pol. to HH and LH

QW width (Å): 30.0 C-HH: 0.5

C-LH: 0.5

**[ VCSEL ]**

☒ Calculate RCWA

Layer of source: 1

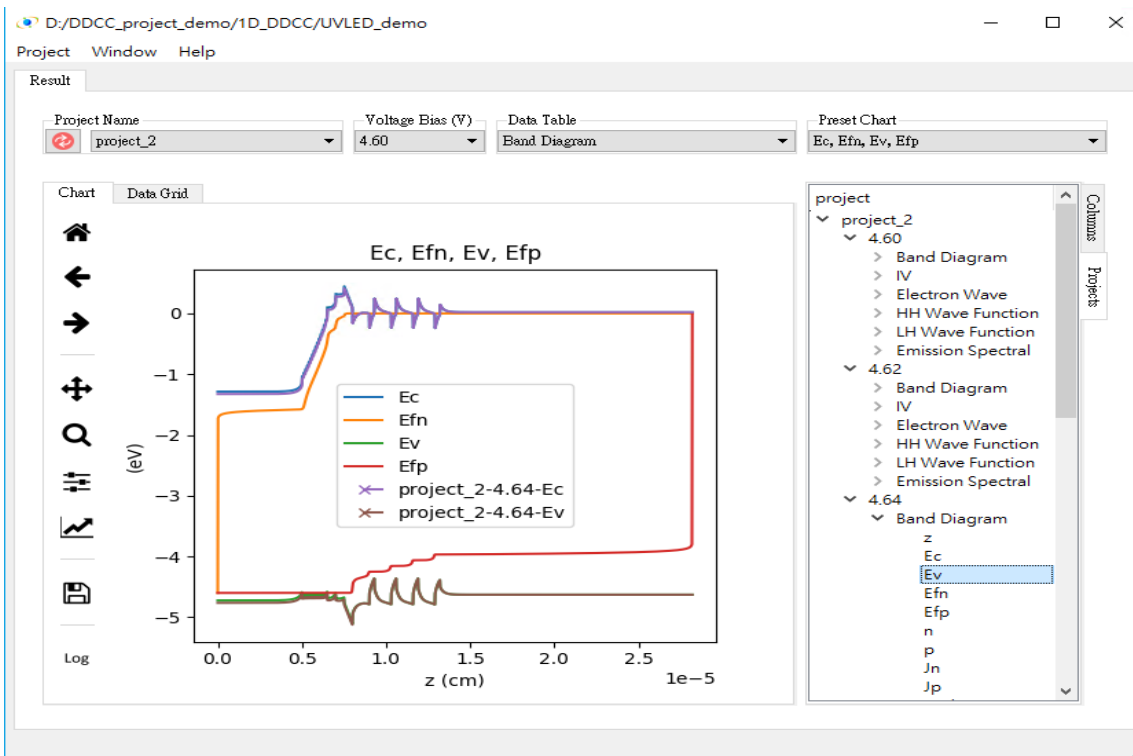
Intensity of source: 1.0

	Material	xposition	yposition	Thickness (Å)	Refractive Index	Absorption $\alpha$ (1/c)
10	Al(x)Ga(1-x)N	0.1	0.0	10.0	2.4547	0.0
11	Al(x)Ga(1-x)N	0.3	0.0	10.0	2.3933	0.0
12	Al(x)Ga(1-x)N	0.1	0.0	10.0	2.4547	0.0
13	Al(x)Ga(1-x)N	0.3	0.0	10.0	2.3933	0.0
14	Al(x)Ga(1-x)N	0.1	0.0	10.0	2.4547	0.0
15	Al(x)Ga(1-x)N	0.3	0.0	10.0	2.3933	0.0
16	Al(x)Ga(1-x)N	0.1	0.0	10.0	2.4547	0.0
17	Al(x)Ga(1-x)N	0.3	0.0	10.0	2.3933	0.0
18	In(x)Ga(1-x)N	0.0	0.0	1000.0	2.4854	0.0
19	In(x)Ga(1-x)N	0.0	0.0	100.0	2.4854	0.0
20	In(x)Ga(1-x)N	0.15	0.0	30.0	2.4873	0.0
21	In(x)Ga(1-x)N	0.0	0.0	100.0	2.4854	0.0
22	In(x)Ga(1-x)N	0.15	0.0	30.0	2.4873	0.0
23	In(x)Ga(1-x)N	0.0	0.0	100.0	2.4854	0.0
24	In(x)Ga(1-x)N	0.15	0.0	30.0	2.4873	0.0
25	In(x)Ga(1-x)N	0.0	0.0	100.0	2.4854	0.0

**[ Design of Epitaxial Layers and Cavity ]**

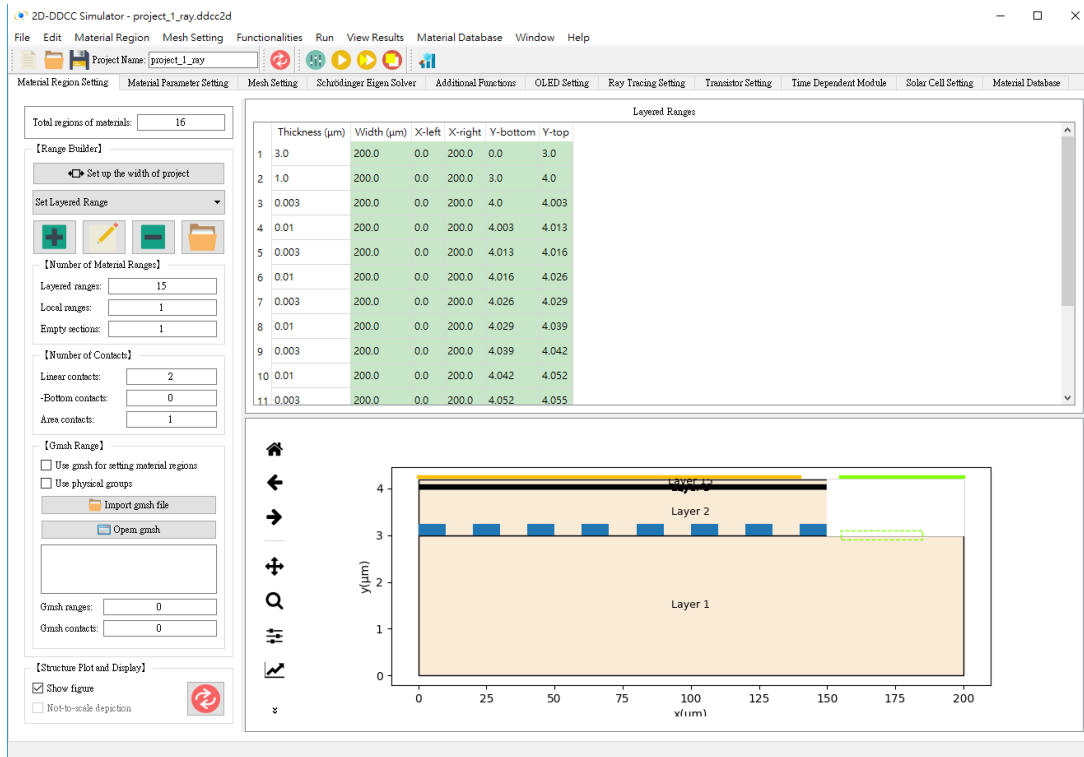
Cavity Layers Epitaxial Layers

### 4. Result visualizer for 1D simulations

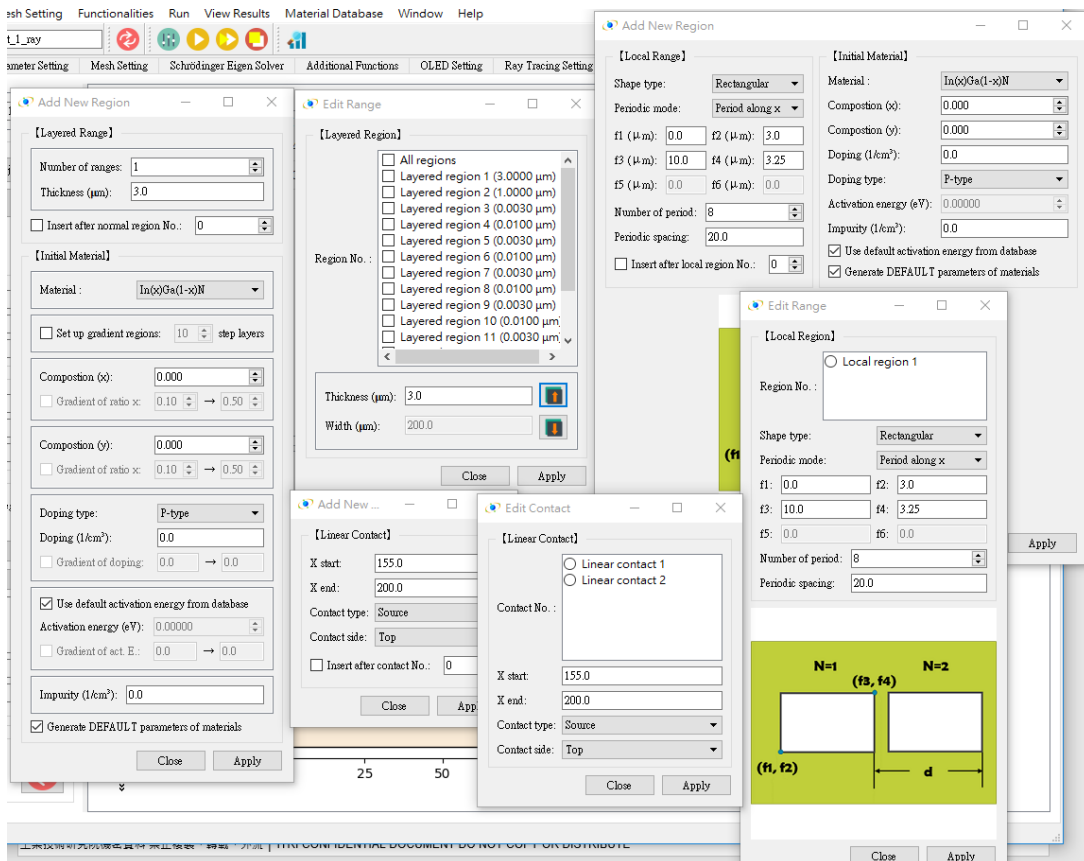


# (2D) TCAD Software Demo

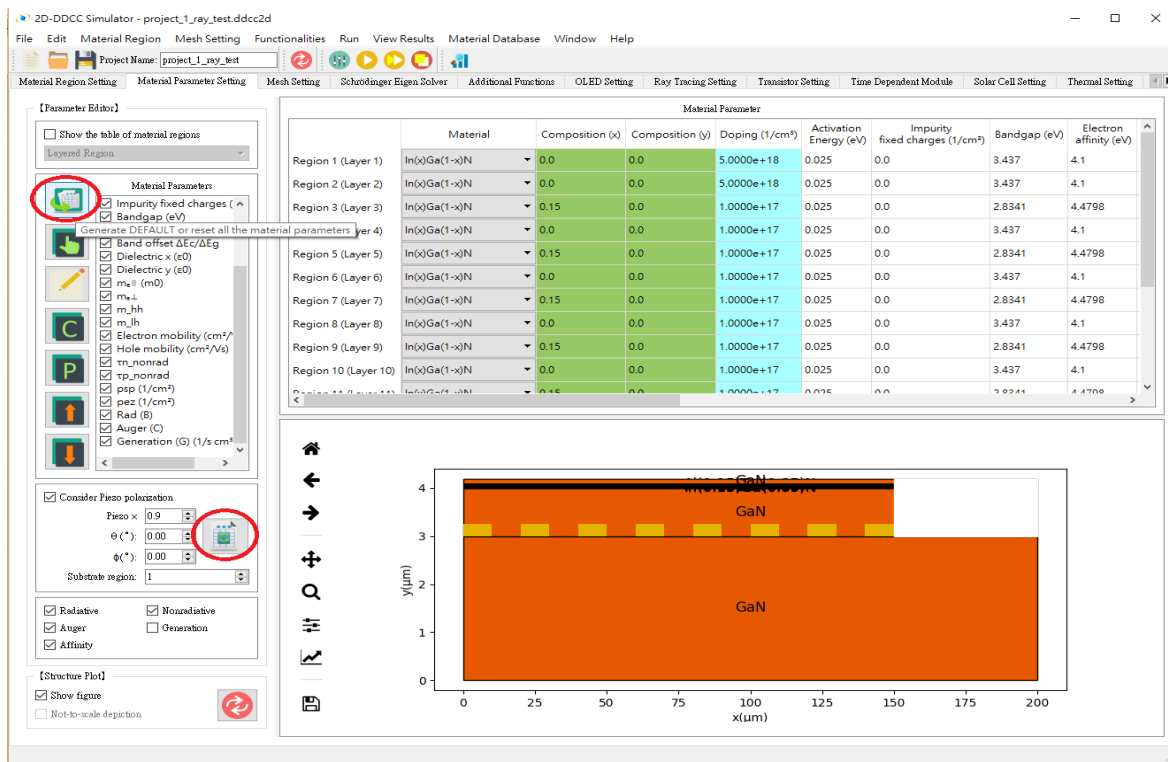
## 1. Tab of region setting (geometric definitions)



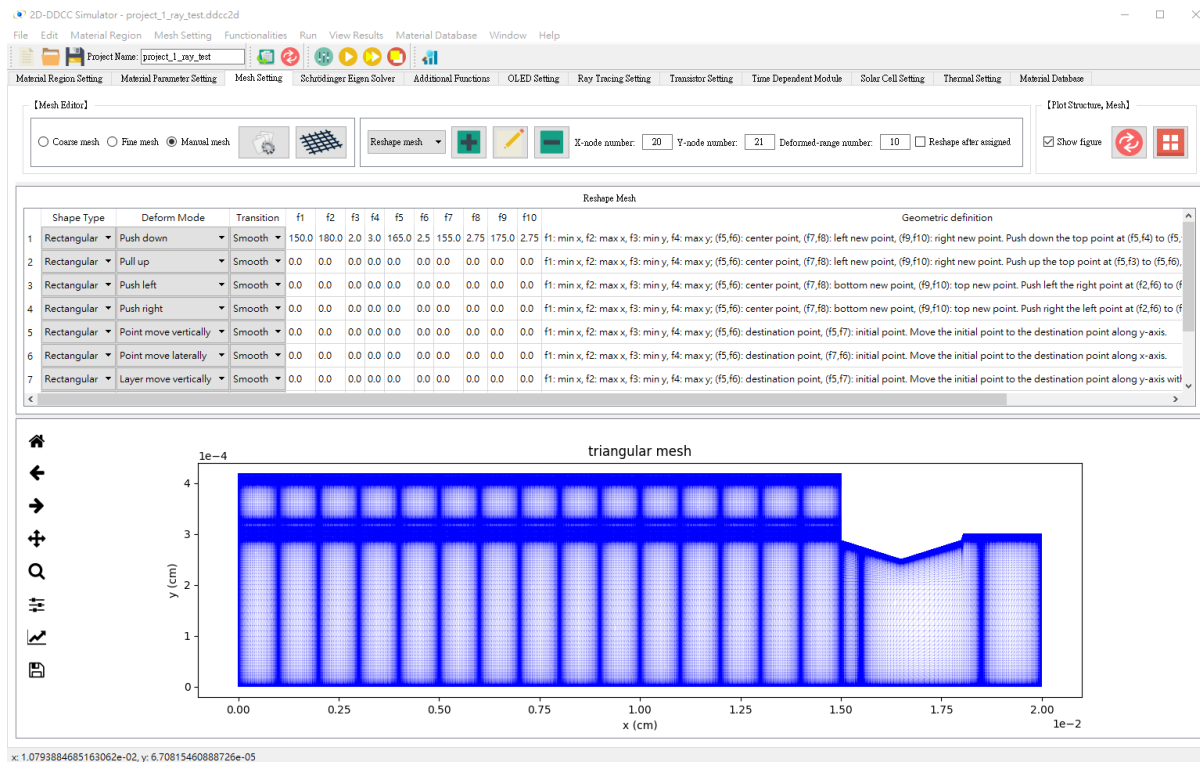
## 2. Setting dialogs



### 3. Tab of material setting (material parameters)

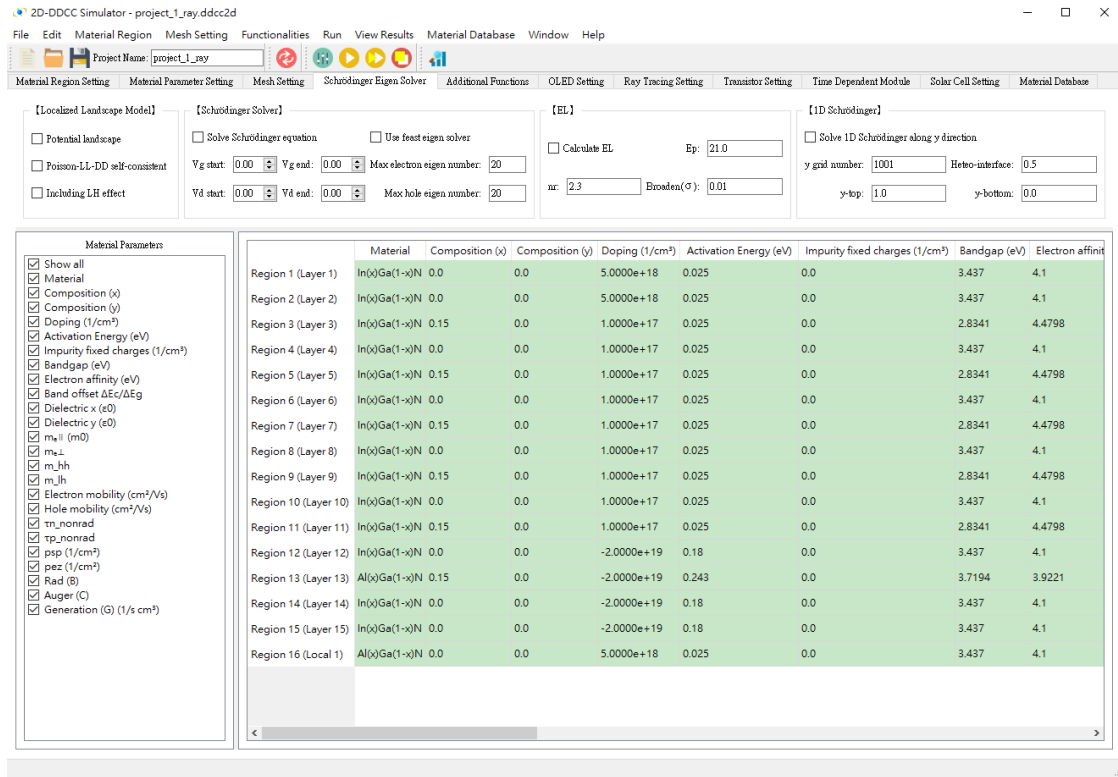


### 4. Tab of mesh setting (automatically generating mesh)

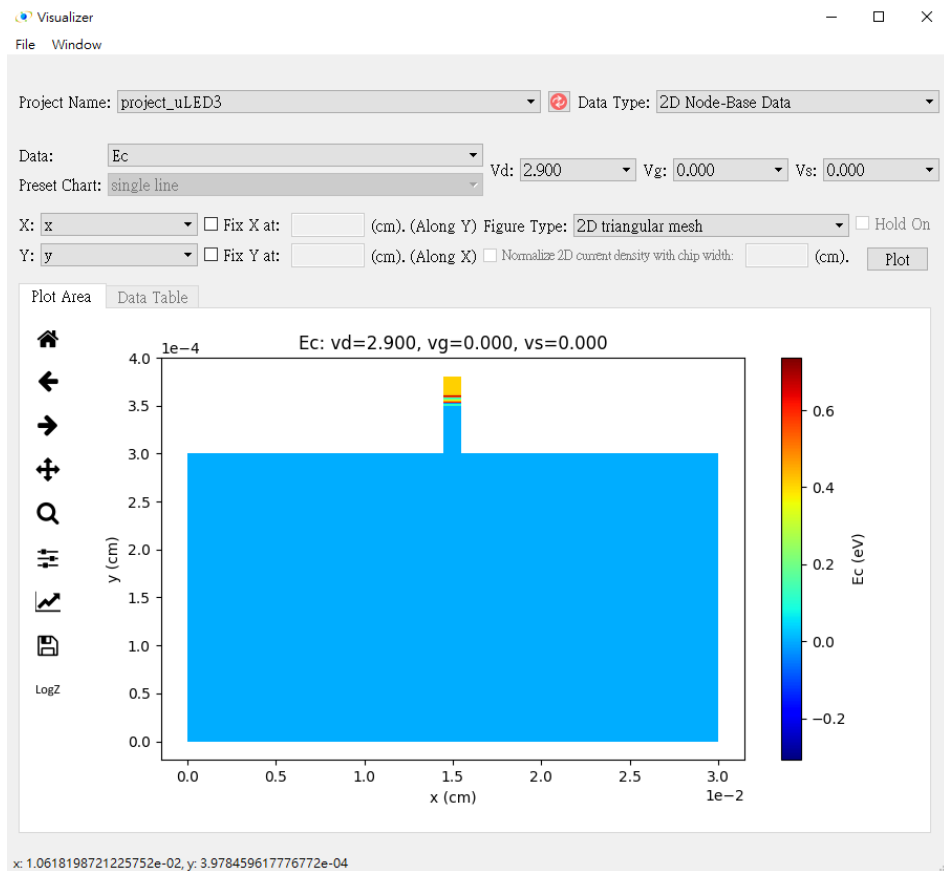


x: 1.0793884685163062e-02, y: 6.7081546088726e-05

## 5. Tab of Schrodinger solver

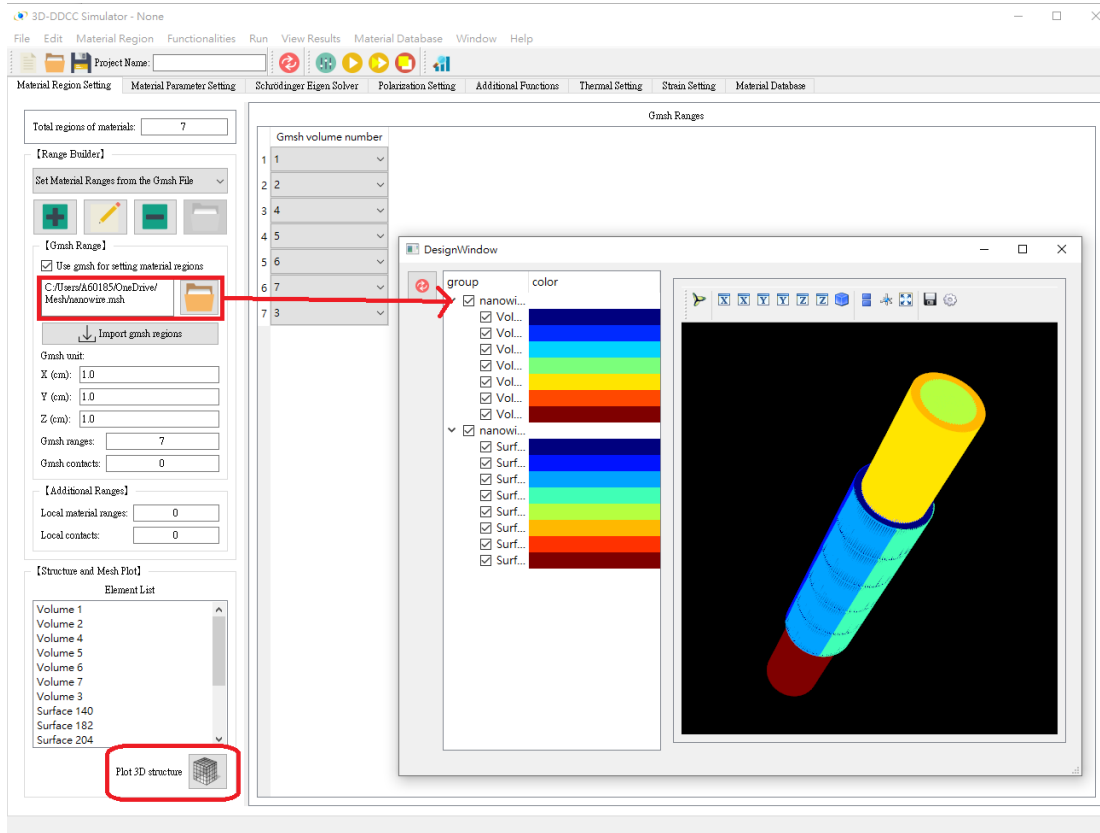


## 6. Result visualizer

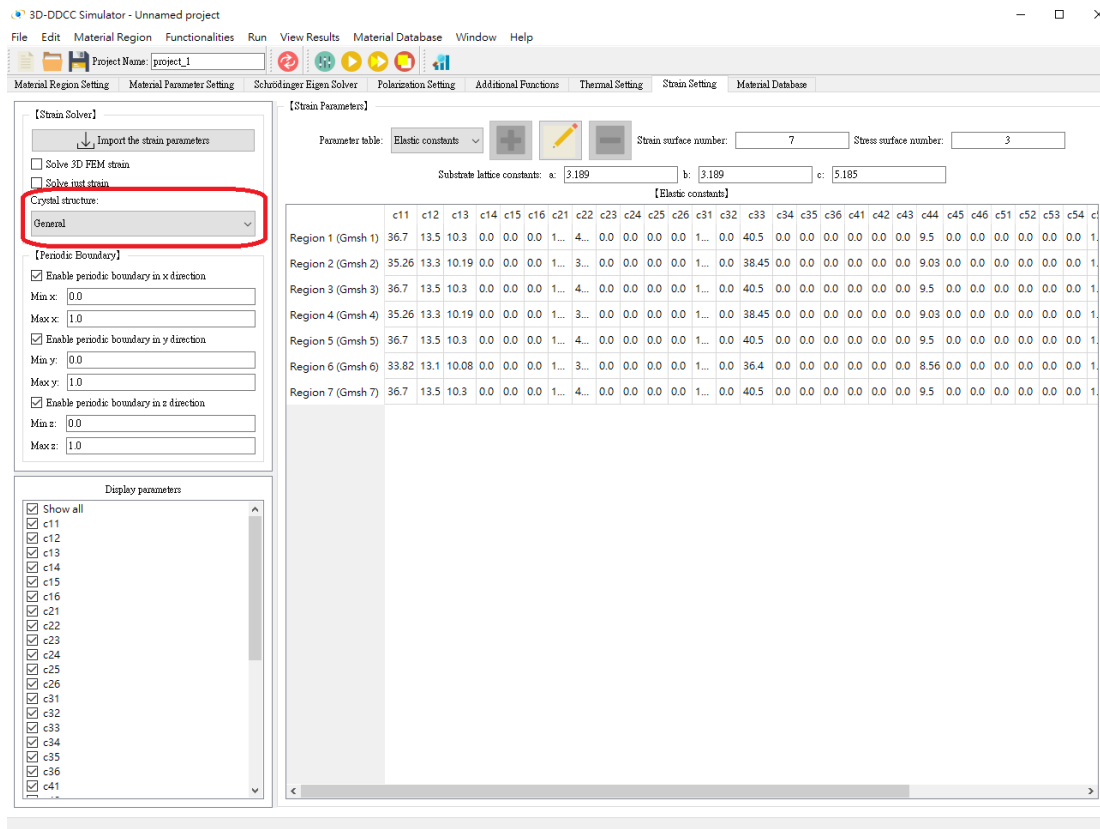


## (3D) TCAD Software Demo

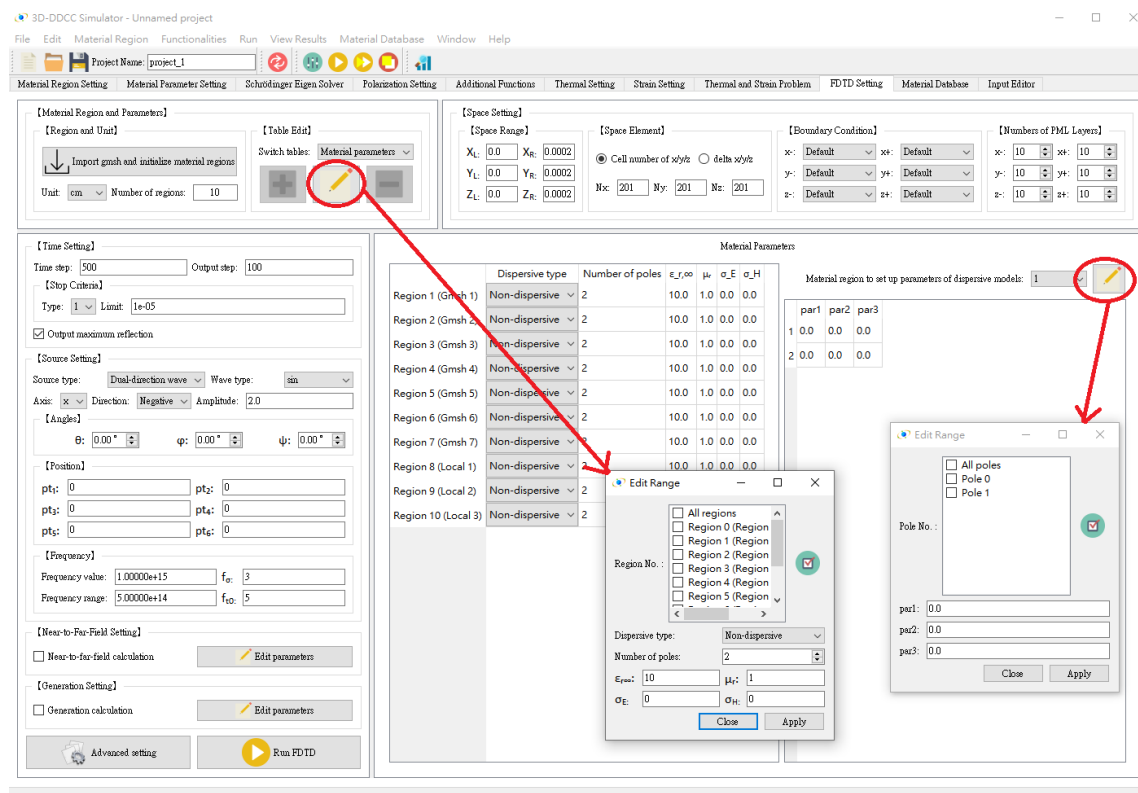
### 1. Tab of (gmsh) region setting and demonstration



### 2. Tab of setting strain solver



### 3. Tab of setting FDTD simulation



### 4. Integrated result visualizer for 3D

