DoseZ

June 6, 2023

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```
from pathlib import Path
import os
import numpy as np
import SimpleITK as sitk
import matplotlib.pyplot as plt
import pandas as pd
```

1 Set Dose

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```
# Change by your own output folder
output_folder = Path('./output')

# Read mhd/raw file: dose, dose squared
dose_img = os.path.join(output_folder, 'run01-Dose.mhd')
squared_img = os.path.join(output_folder, 'run01-Dose-Squared.mhd')

# Change to array
dose_array = sitk.GetArrayFromImage(sitk.ReadImage(dose_img))
squared_array = sitk.GetArrayFromImage(sitk.ReadImage(squared_img))
```

2 Set Dose Z

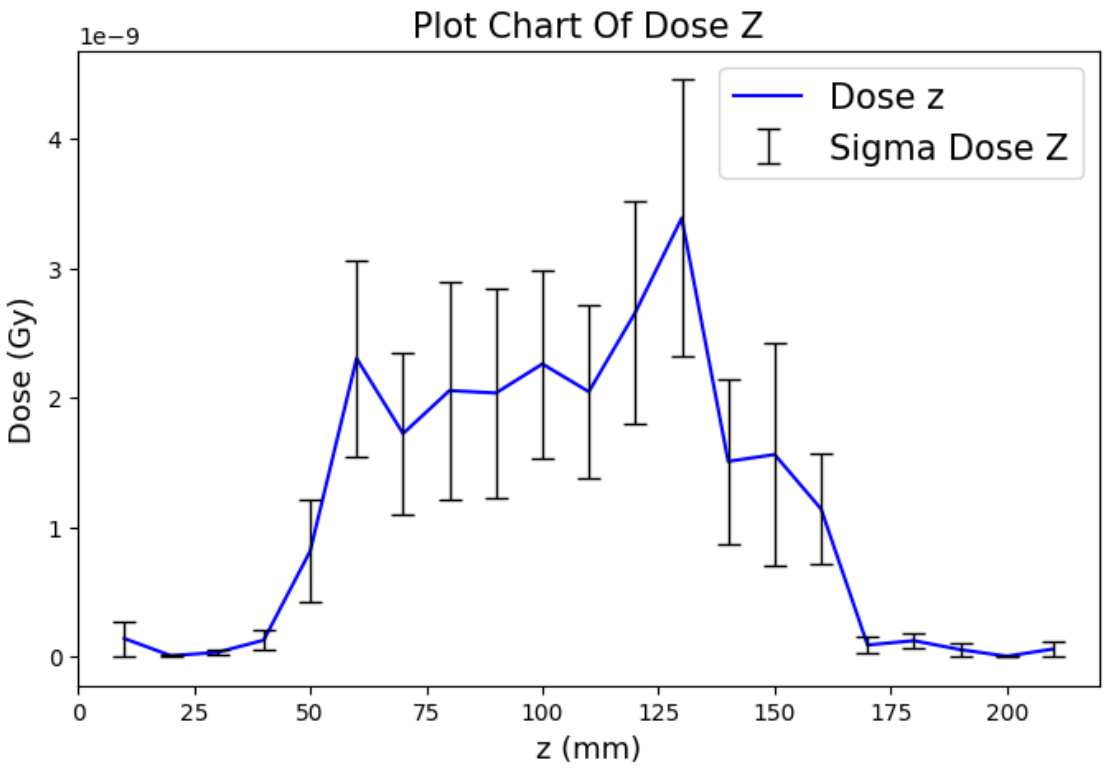
[ ]:
```
# x: 210 mm, y: 210 mm, z: 210 mm, voxel: 10 mm
num_voxel = 21

# Get value of dose Z
dose_z = []
for i in range(len(dose_array)):
    dose_z.append(dose_array[10, 10, i])

# Get value of Square Dose Z
squared_z = []
for i in range(len(squared_array)):
    squared_z.append(squared_array[10, 10, i])

# Set position
```

```
poi = np.linspace(10, 210, 21)

# Set Table to show all value

data ={
    "z (mm)": poi,
    "Dose (Gy)": dose_z,
    "Sigma": np.sqrt(squared_z)
}

df = pd.DataFrame(data)
display(df)

df.to_excel("Data_Dose_Z.xlsx", index=False)
```

	z (mm)	Dose (Gy)	Sigma
0	10.0	1.403006e-10	1.315684e-10
1	20.0	7.694312e-12	5.223809e-12
2	30.0	3.295810e-11	2.314991e-11
3	40.0	1.276004e-10	7.627755e-11
4	50.0	8.154787e-10	3.984531e-10
5	60.0	2.304049e-09	7.582153e-10
6	70.0	1.723502e-09	6.228375e-10
7	80.0	2.055617e-09	8.379856e-10
8	90.0	2.036784e-09	8.086956e-10
9	100.0	2.261513e-09	7.283894e-10
10	110.0	2.046772e-09	6.675676e-10
11	120.0	2.659366e-09	8.569945e-10
12	130.0	3.387937e-09	1.070862e-09
13	140.0	1.508355e-09	6.353540e-10
14	150.0	1.561662e-09	8.577444e-10
15	160.0	1.141036e-09	4.273825e-10
16	170.0	9.035347e-11	6.722112e-11
17	180.0	1.234719e-10	5.913339e-11
18	190.0	5.418920e-11	5.418920e-11
19	200.0	3.494112e-12	3.494112e-12
20	210.0	5.929227e-11	5.472654e-11

[ ]:
```
plt.figure(figsize=(8,5), dpi=100)
plt.plot(poi, dose_z, color='blue', label="Dose z")
plt.errorbar(poi, dose_z, yerr=np.sqrt(squared_z), fmt="None", color='black',␣
 ↪linewidth=1, capsize=5, label="Sigma Dose Z")

plt.title("Plot Chart Of Dose Z", fontsize=15)
plt.legend(fontsize=15)
plt.xlabel("z (mm)", fontsize=13)
plt.ylabel("Dose (Gy)", fontsize=13)
```

```
plt.savefig("Dose_z.png", dpi=300)
```



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