Derenzo Phantom iCheckRotations.ipynb

Bill Worstell

PicoRad->MGH

1/16/2024

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Insert phantom into source volume, with Rotation=[pi/4.,5*(pi/180),0], Translation=[0,0,0]

Insert phantom into source volume, with Rotation=[0.,90*(pi/180),0*(pi/180)], Translation=[0,0,0]

Insert phantom into source volume, with Rotation=[pi/2,90*(pi/180),90*(pi/180)], Translation=[0,0,0]

Insert phantom into source volume, with Rotation=[0,45*(pi/180),0], Translation=[0,0,0]

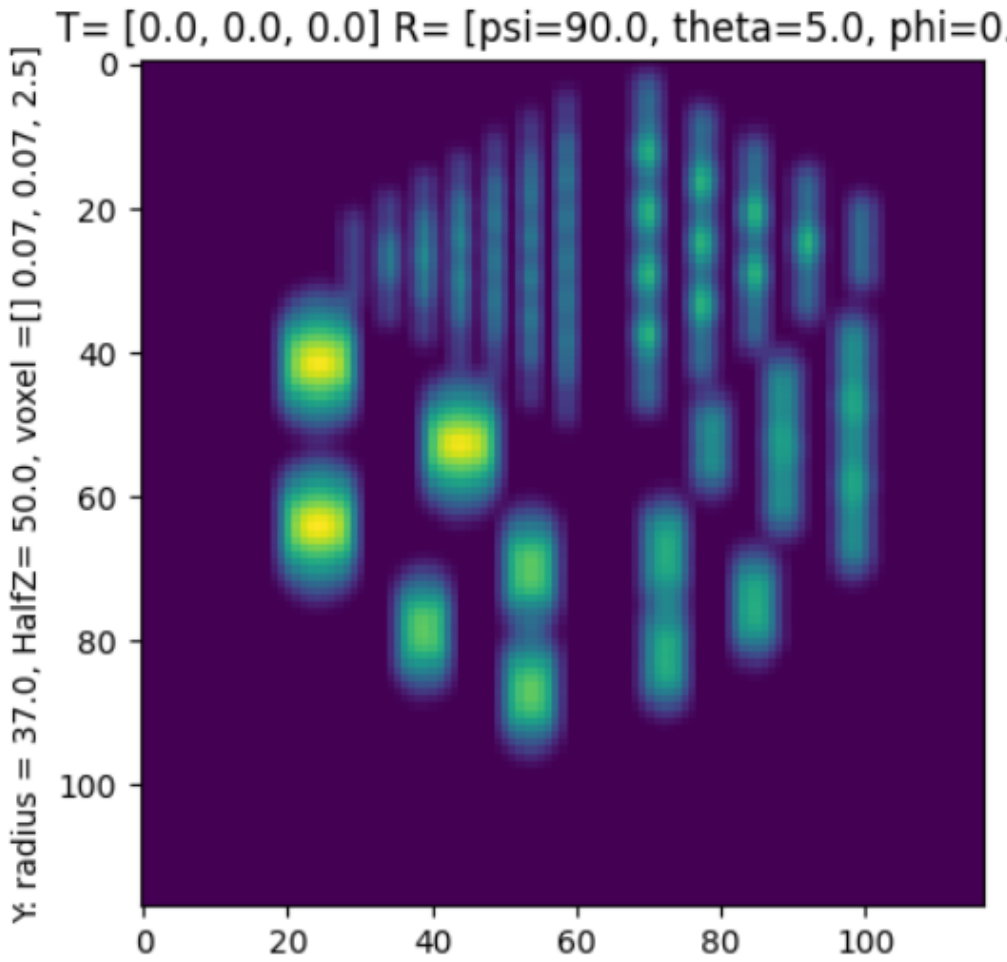
Insert phantom into source volume, with Rotation=[0,45*(pi/180),90*(pi/180)], Translation=[0,0,0]

Insert phantom into source volume, with Rotation=[90*(pi/180),45*(pi/180),90*(pi/180)], Translation=[0,0,0]

+ Section

```
12 plt.ylabel(f'Y: radius = {radius:.1f}, HalfZ= {PhantomHalfZ:.1f}' + VoxelStrin
```

```
T= [0.0, 0.0, 0.0]
R= [psi=90.0, theta=5.0, phi=0.0]
Text(0, 0.5, 'Y: radius = 37.0, HalfZ= 50.0, voxel =[] 0.07, 0.07, 2.5]')
```



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iCheckRotations.ipynb

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Set up DiffDRR environment

Install DiffDRR

Get derenzo_phantom version from github

Specify 3D Phantom Geometry

Insert phantom into source volume, with Rotation=[pi/4,0,0], Translation=[0,0,0]

Insert phantom into source volume, with Rotation=[0.,5*(pi/180),0], Translation=[0,0,0]

Insert phantom into source volume, with Rotation=[pi/4.,5*(pi/180),0], Translation=[0,0,0]

Insert phantom into source volume, with Rotation=[0.,90*(pi/180),0*(pi/180)], Translation=[0,0,0]

Insert phantom into source volume, with Rotation=[pi/2,90*(pi/180),90*(pi/180)], Translation=[0,0,0]


```
T= [0.0, 0.0, 0.0]
R= [psi=90.0, theta=5.0, phi=0.0]
Text(0, 0.5, 'Y: radius = 37.0, HalfZ= 50.0, voxel =[] 0.07, 0.07, 2.5]')
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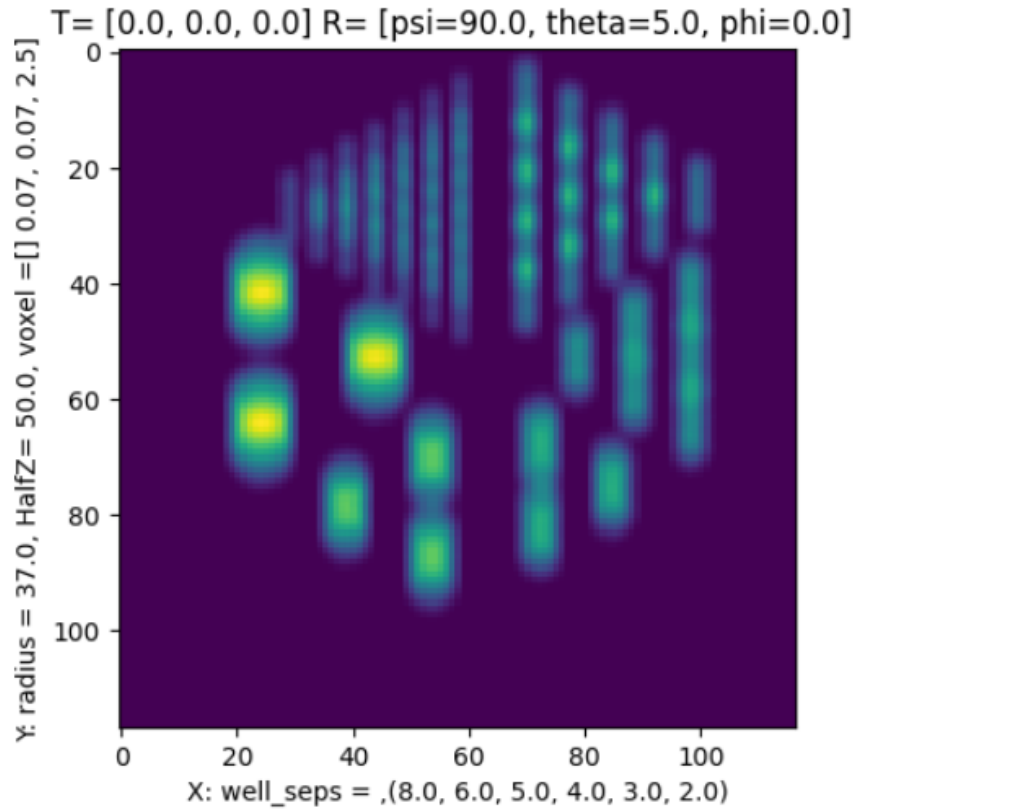


```
[ ]  1 ThisAspect=spacing[2]/spacing[0]
     2 plt.imshow(np.flipud(SumX[192:309,32:100].T),aspect=ThisAspect)
```

github.com/BillWorstell/derenzo_phantom/blob/master/iChec...
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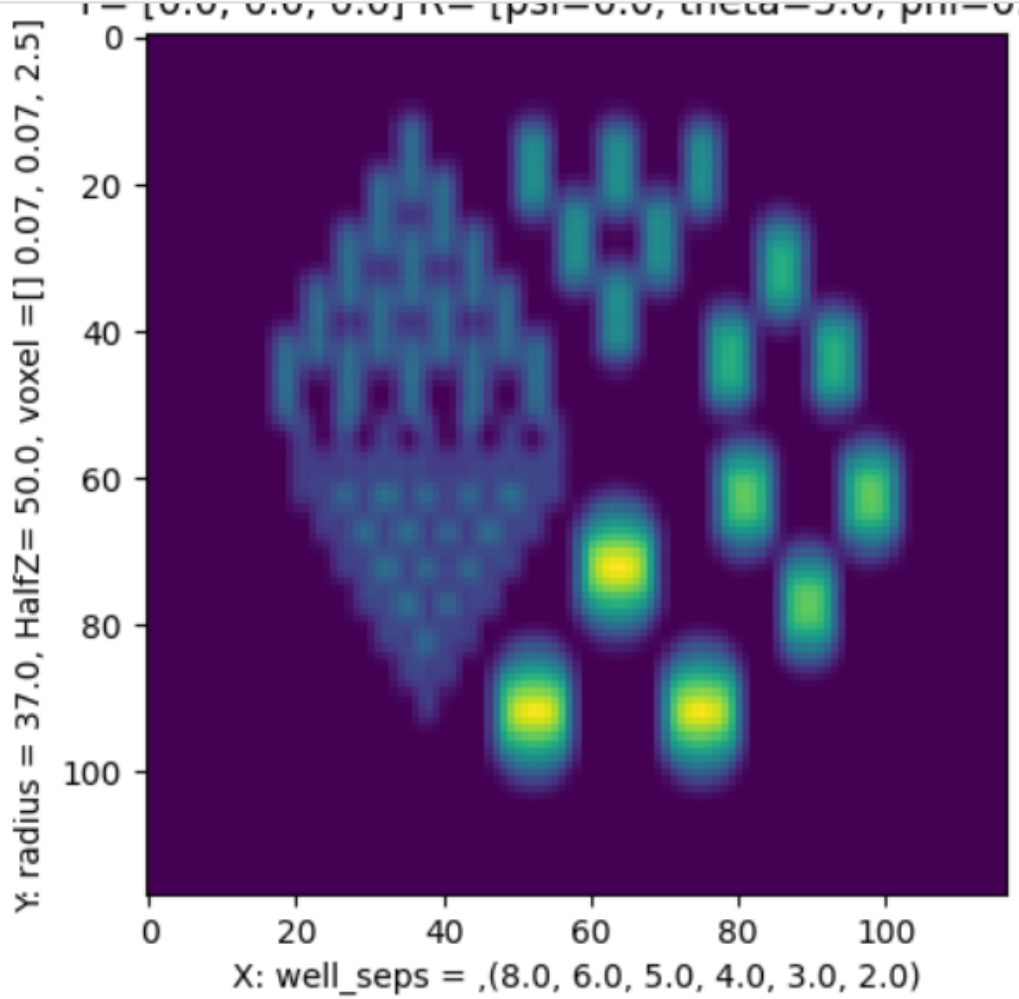
- iphantom2.ipynb
- iphantom3.ipynb
- phantom.py

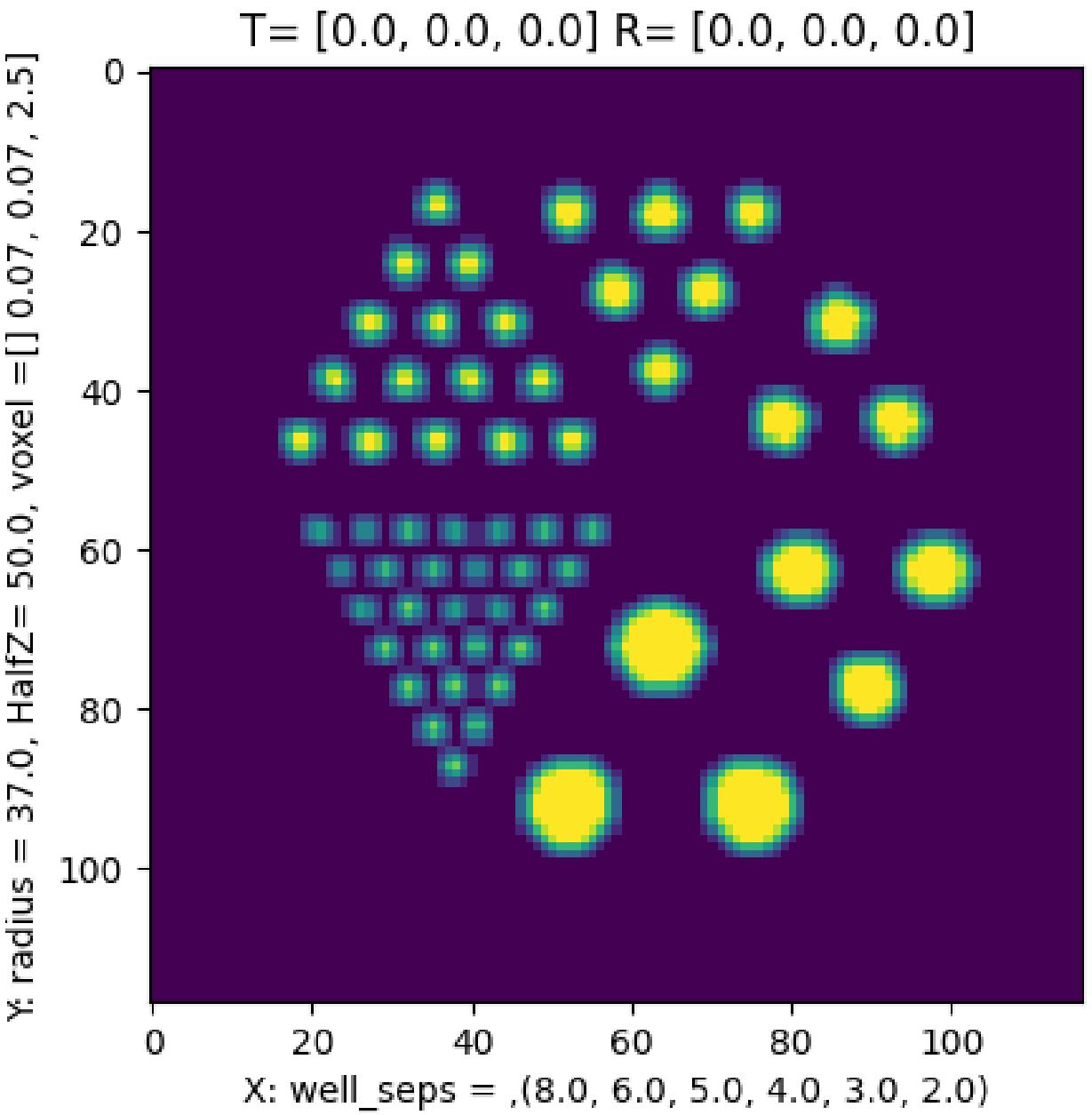
derenzo_phantom / iCheckRotations.ipynb

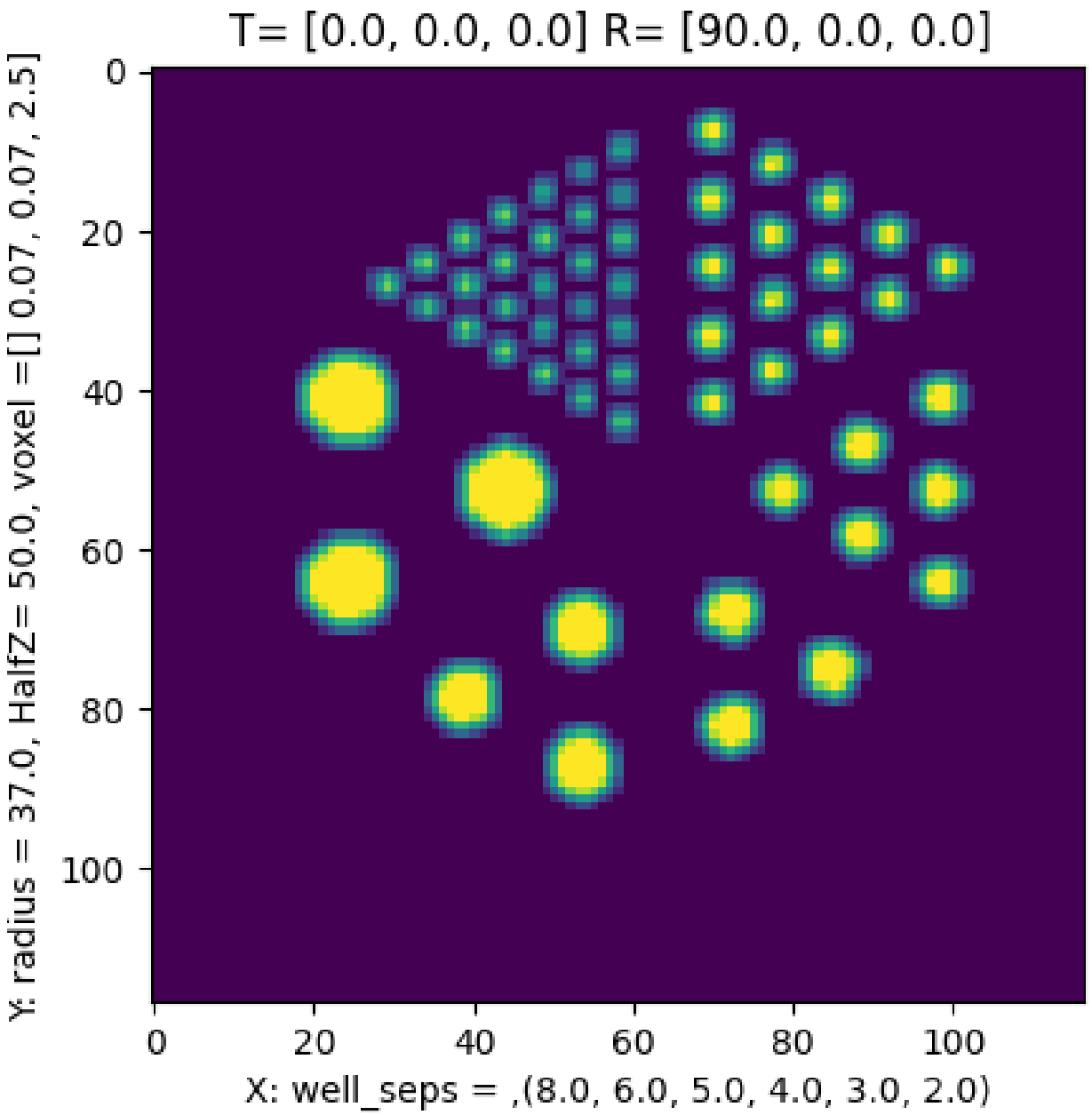
2.56 MB

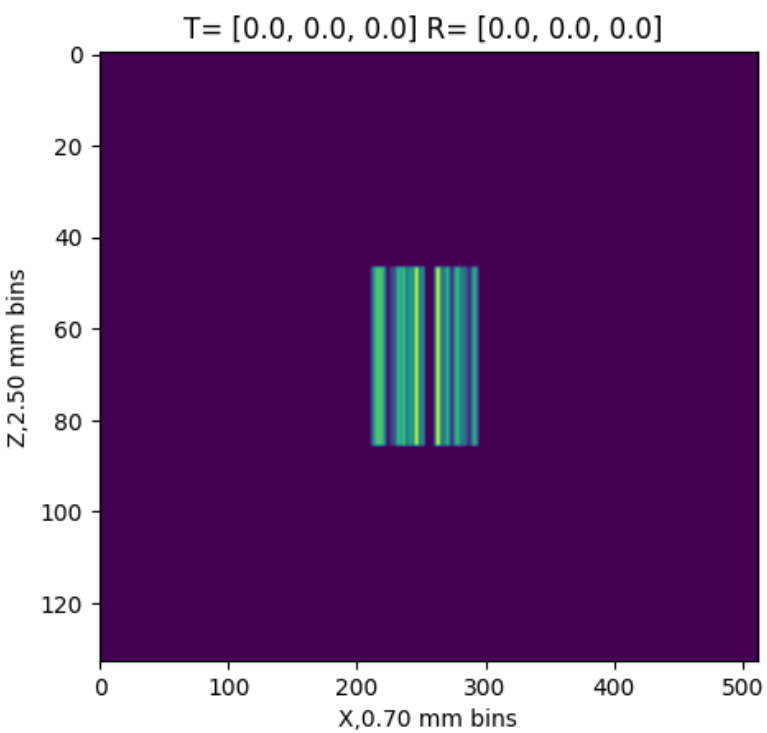


iCheckRotations.ipynb

First rotation in lab frame is about phantom axis



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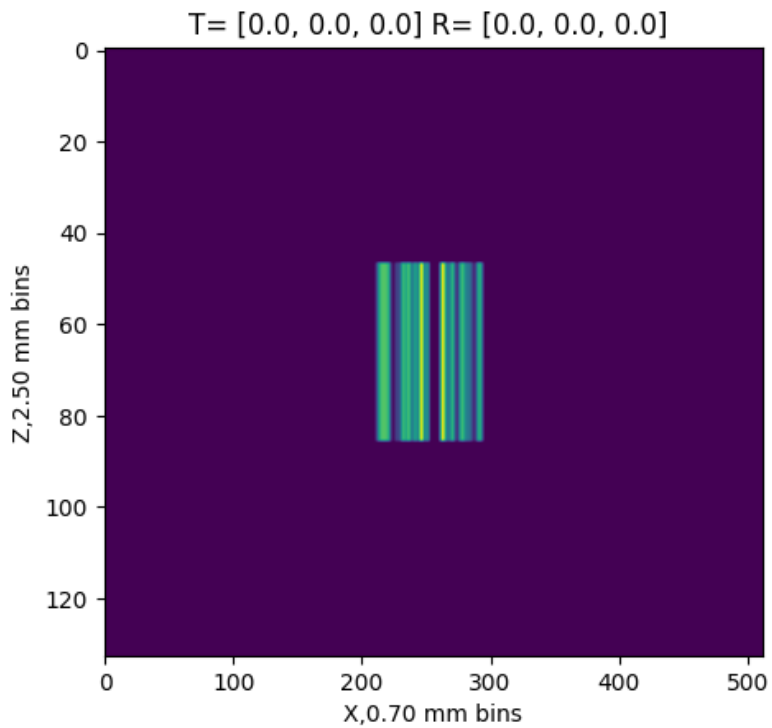
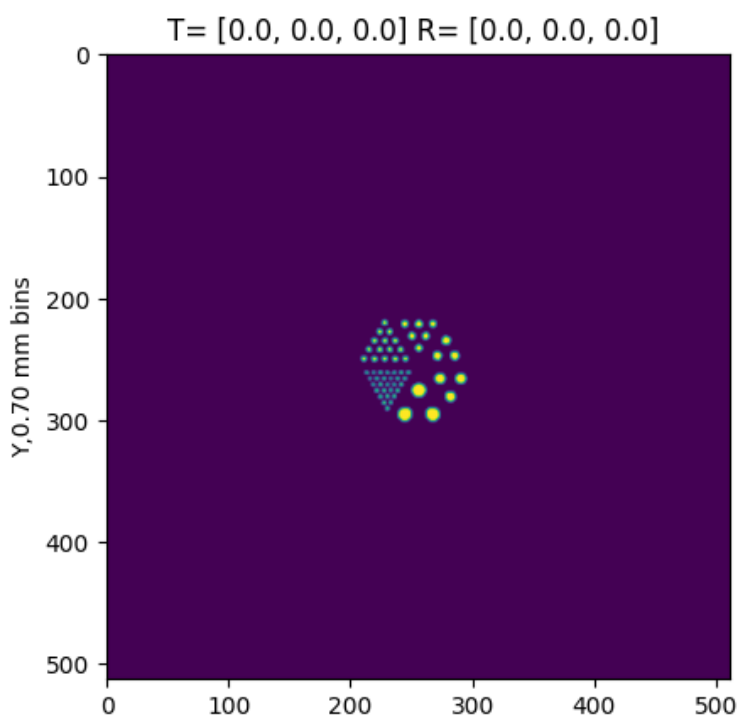
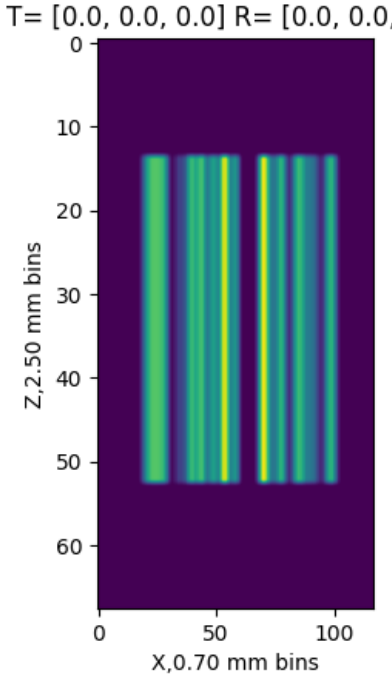
Z,2.50 mm bins
X,0.70 mm bins


T= [0.0, 0.0, 0.0] R= [0.0, 0.0, 0.0]
Z,2.50 mm bins
X,0.70 mm bins


T= [0.0, 0.0, 0.0] R= [0.0, 0.0, 0.0]
Y,0.70 mm bins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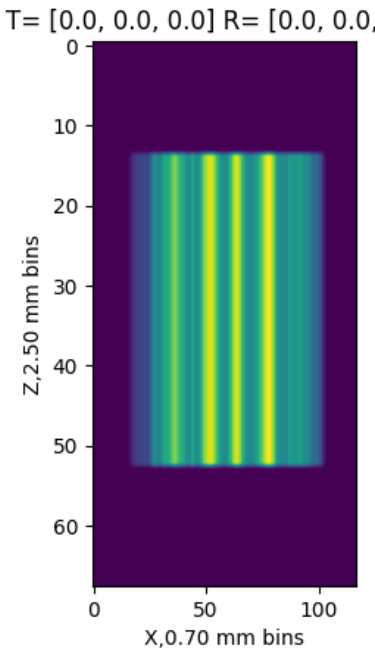
Z,2.50 mm bins
X,0.70 mm bins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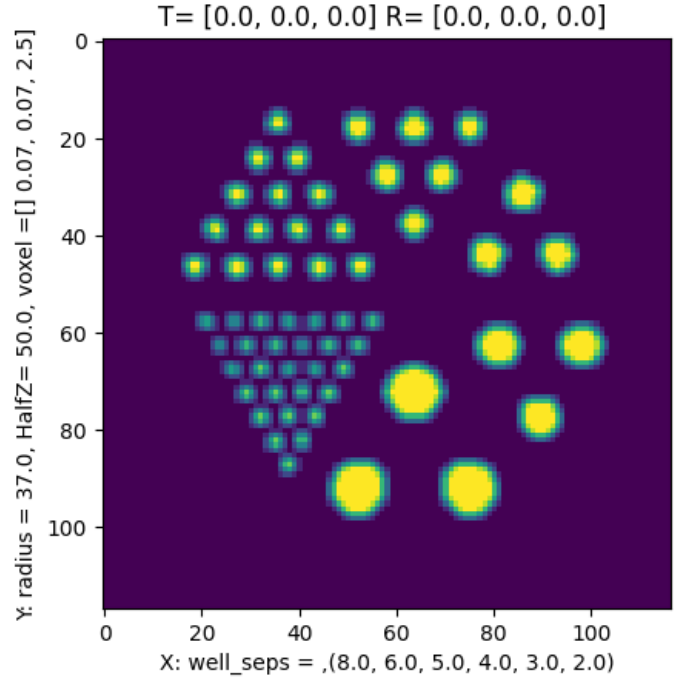
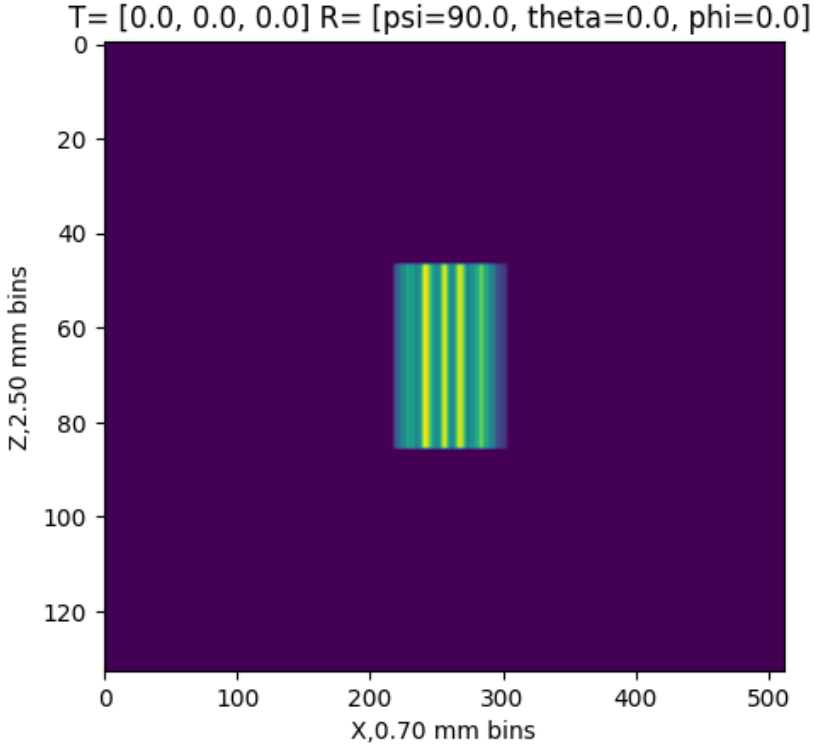
X,0.70 mm bins


T= [0.0, 0.0, 0.0] R= [0.0, 0.0, 0.0]
Y: radius = 37.0, HalfZ= 50.0, voxel =[] 0.07, 0.07, 2.5]
X: well_seps = ,(8.0, 6.0, 5.0, 4.0, 3.0, 2.0)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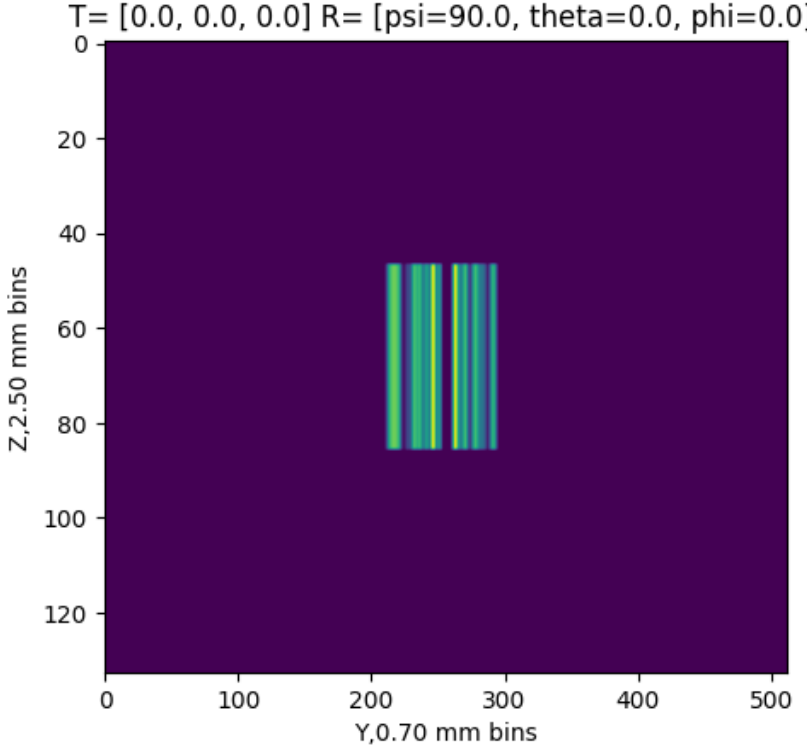
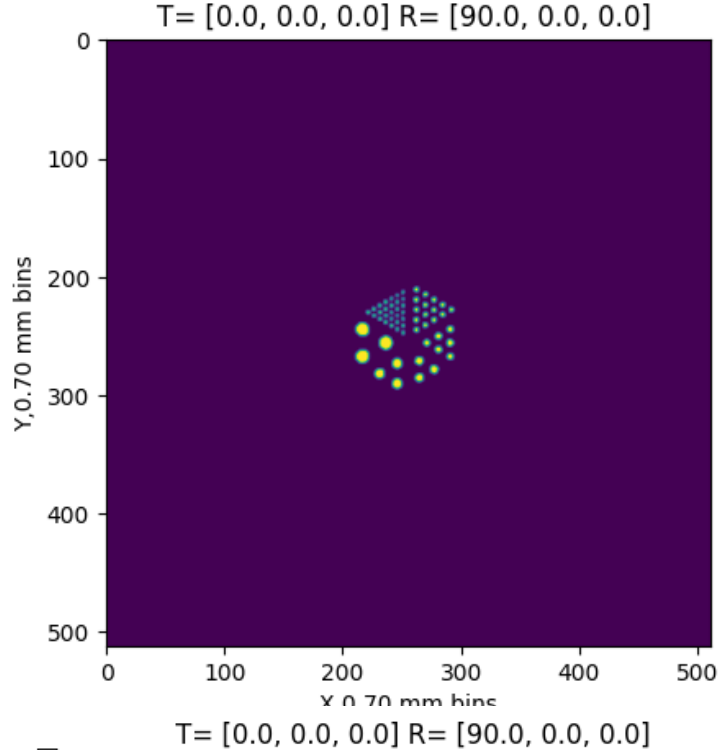

T= [0.0, 0.0, 0.0] R= [psi=90.0, theta=0.0, phi=0.0]
Z,2.50 mm bins
Y,0.70 mm bins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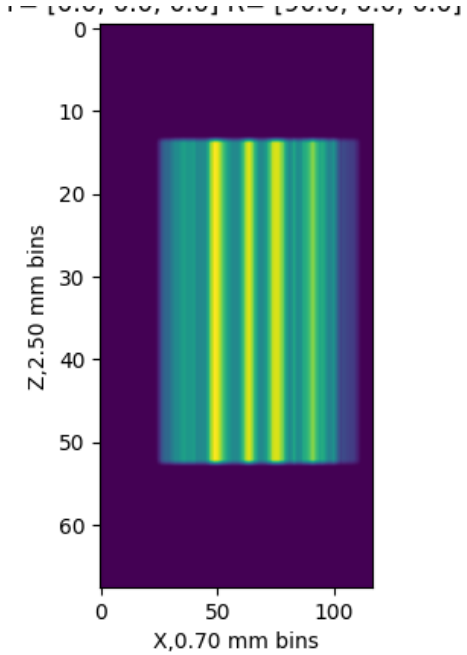
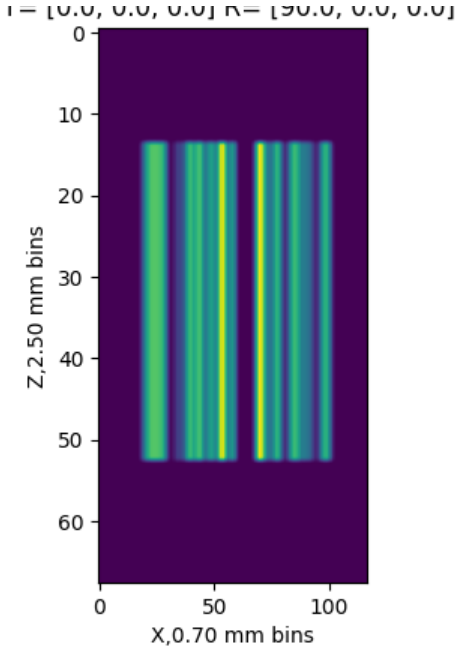
Y,0.70 mm bins


Z,2.50 mm bins
X,0.70 mm bins


Z,2.50 mm bins
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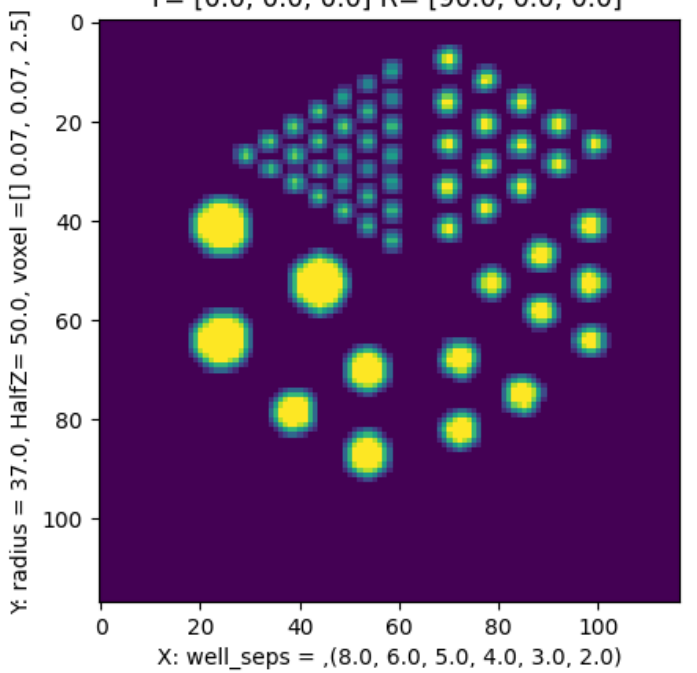
T= [0.0, 0.0, 0.0] R= [90.0, 0.0, 0.0]
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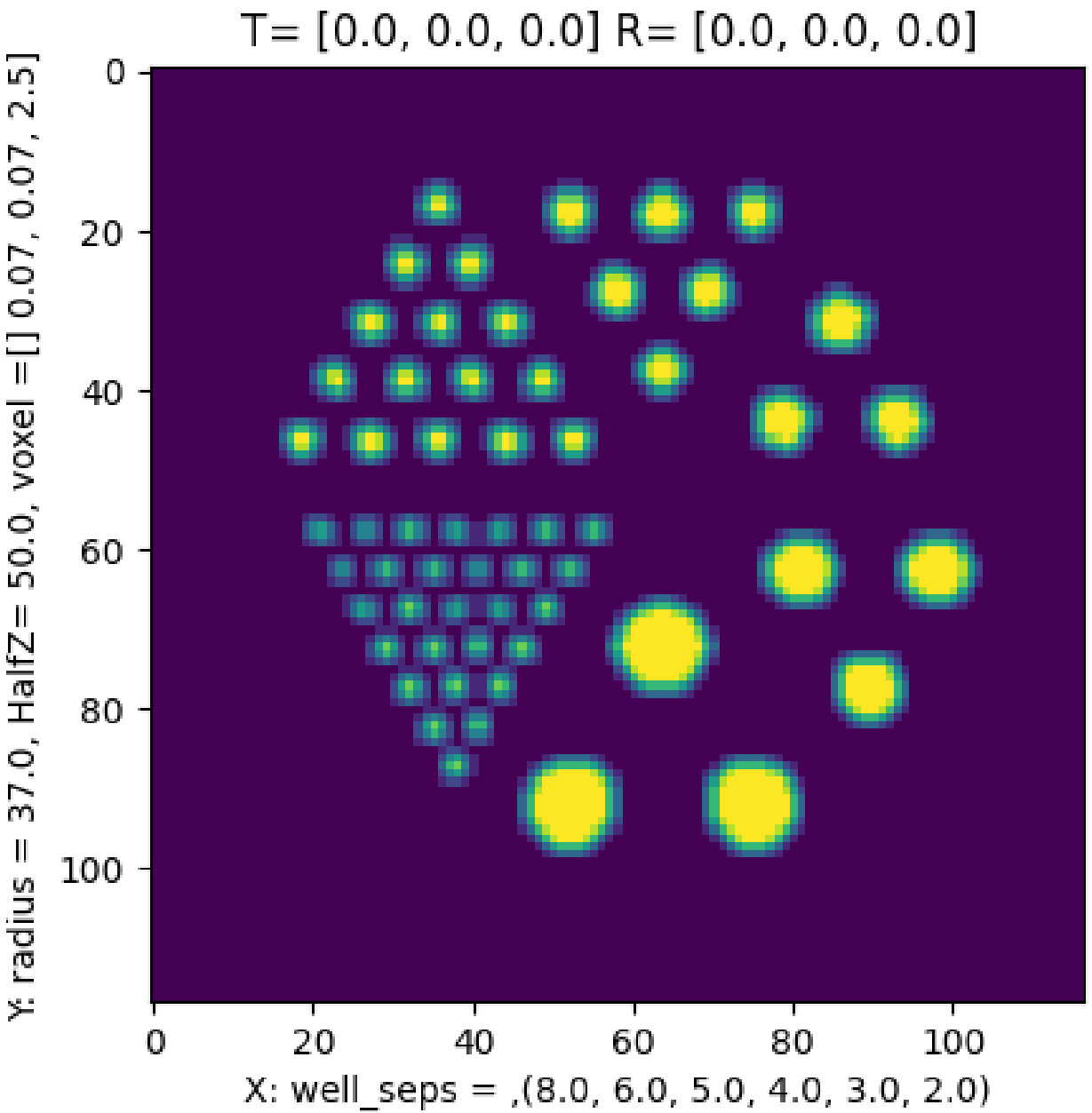
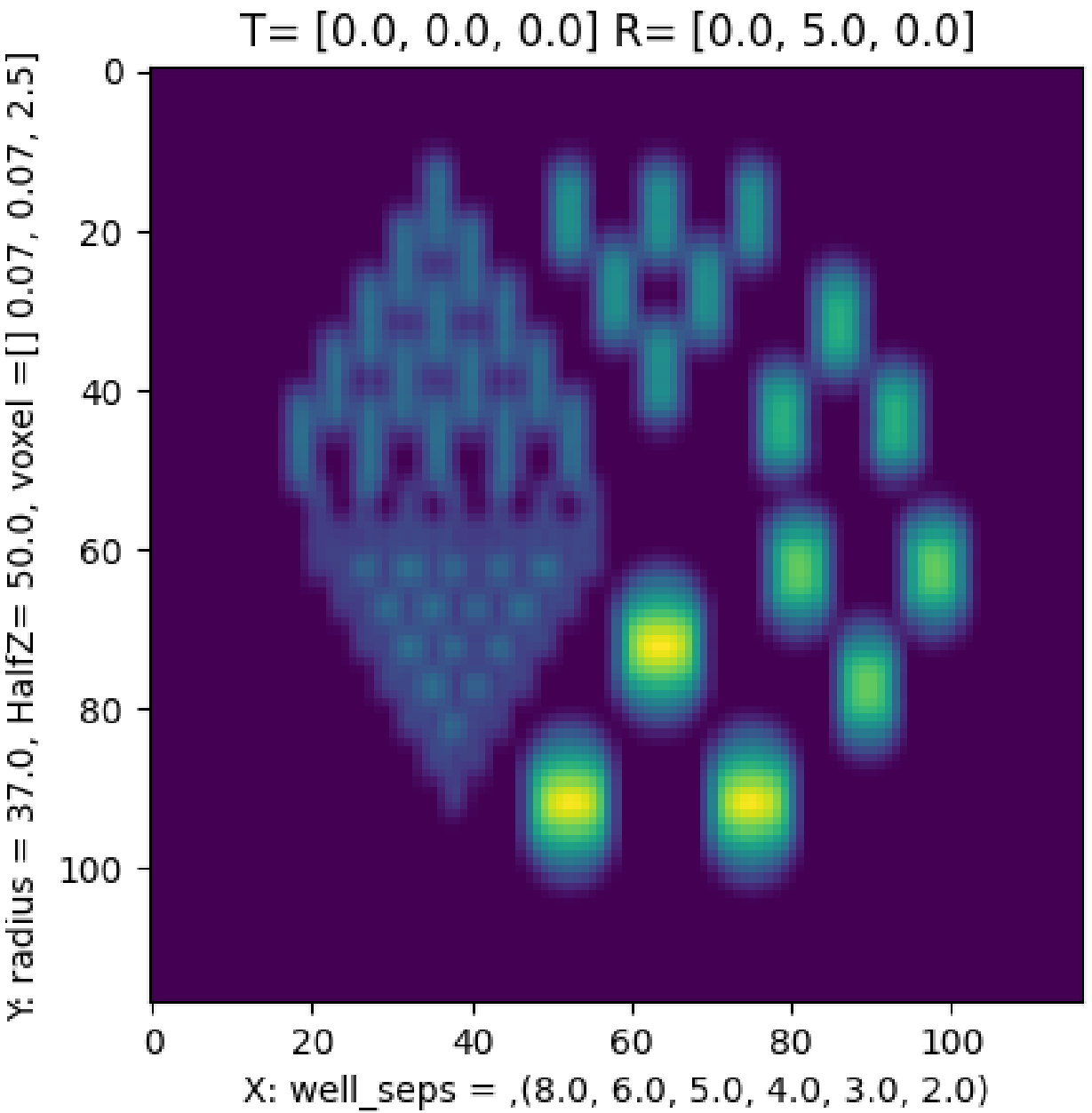
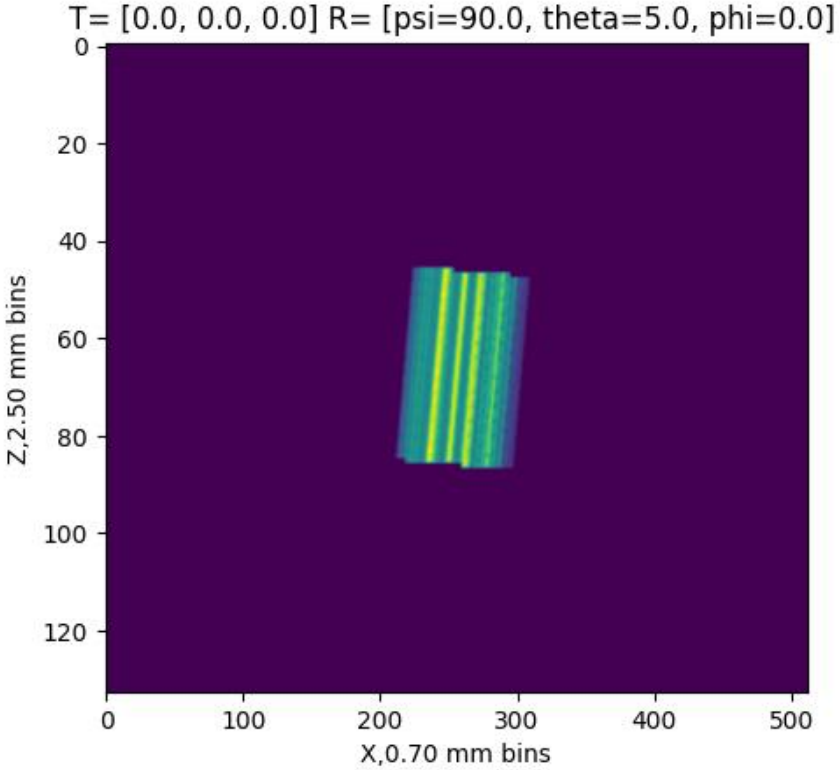
X: well_seps = ,(8.0, 6.0, 5.0, 4.0, 3.0, 2.0)

iCheckRotations.ipynb

Second rotation in lab frame sets phantom axis altitude



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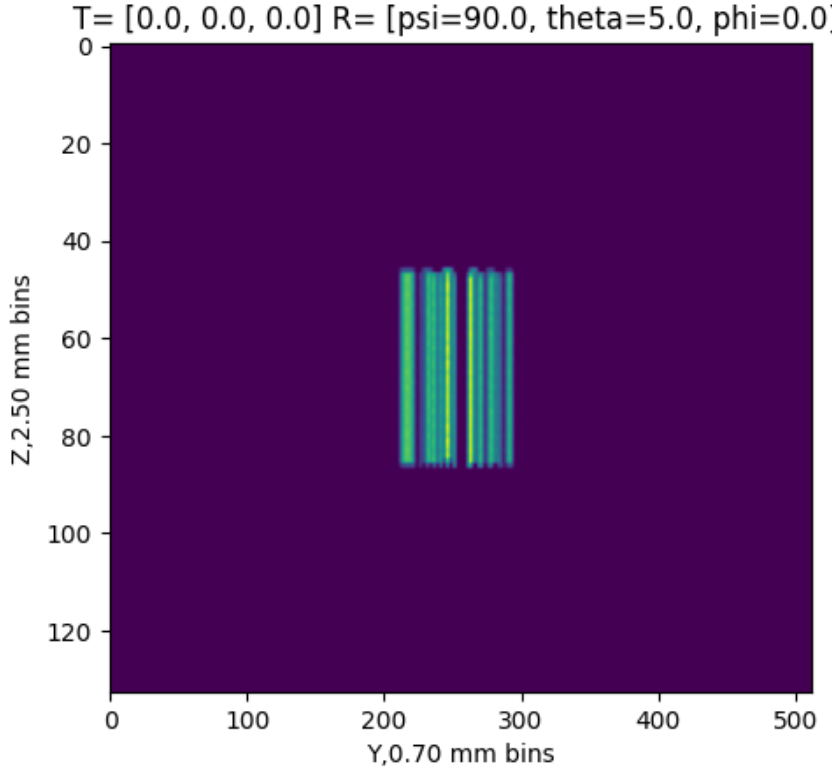
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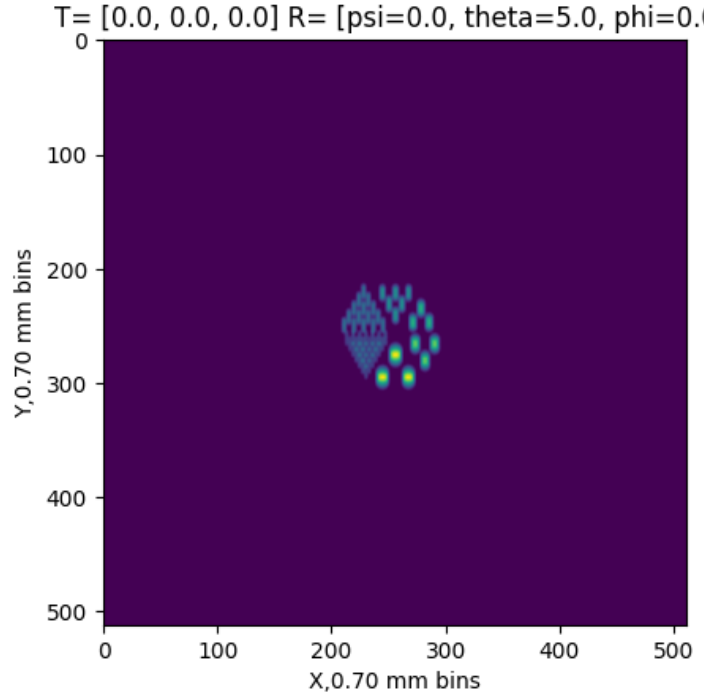
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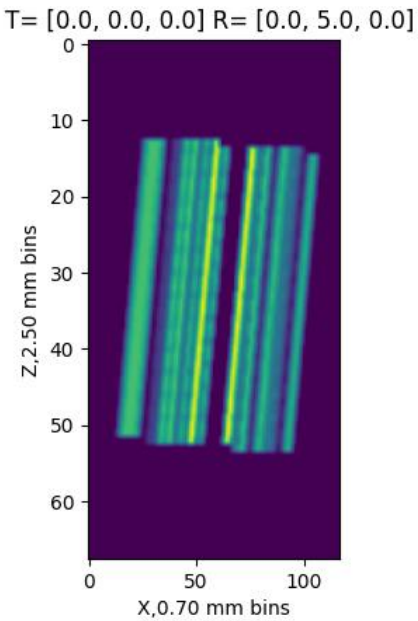
Y,0.70 mm bins
X,0.70 mm bins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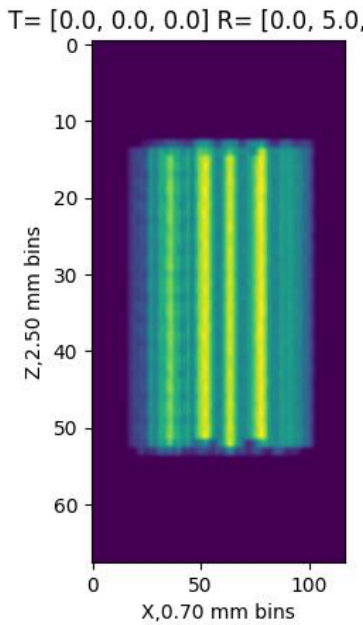
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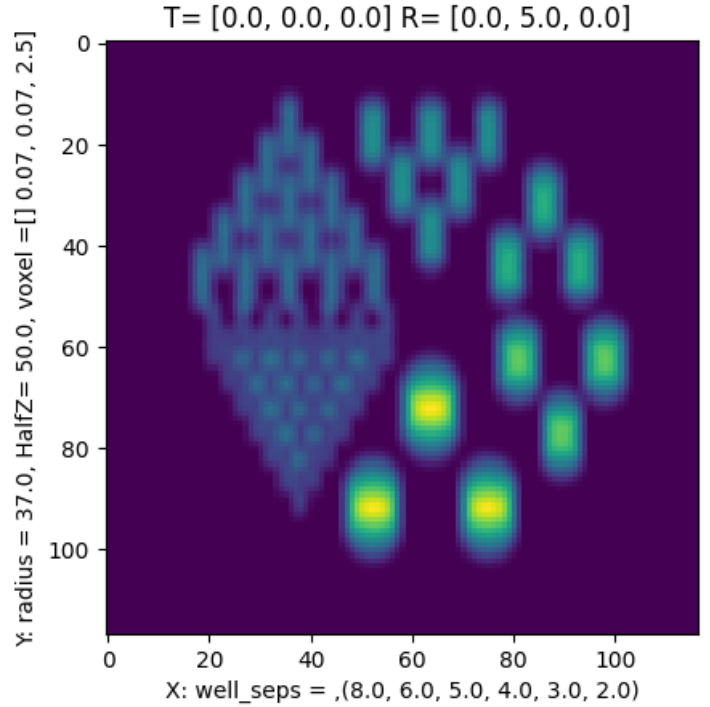
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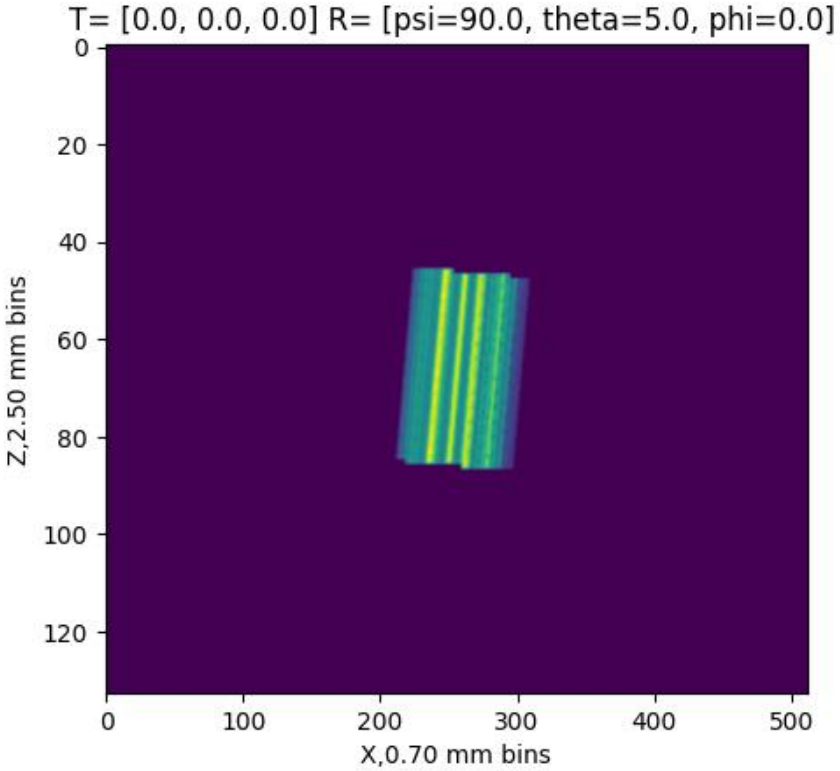
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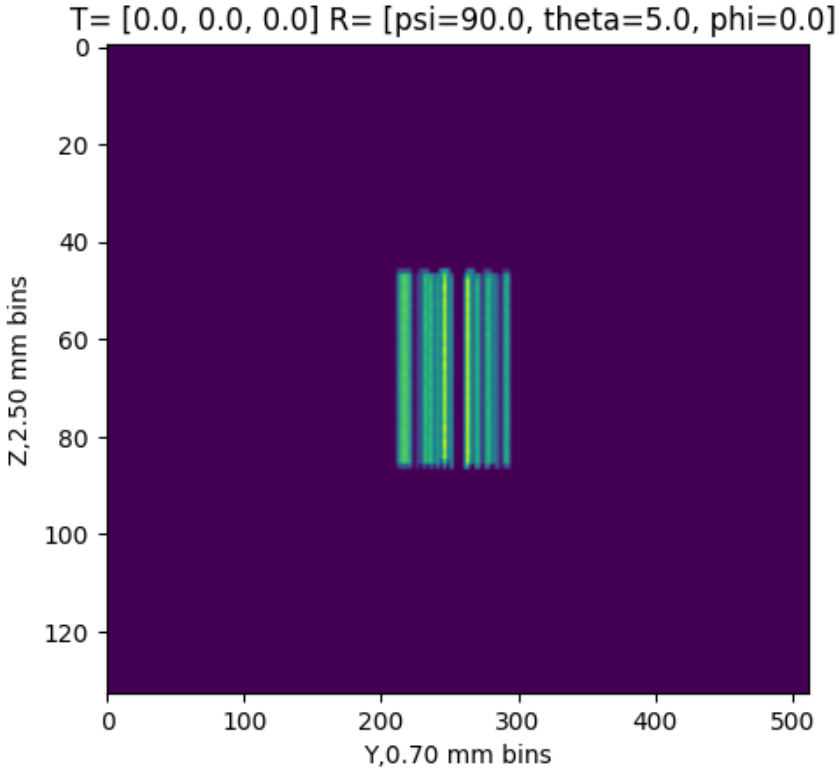
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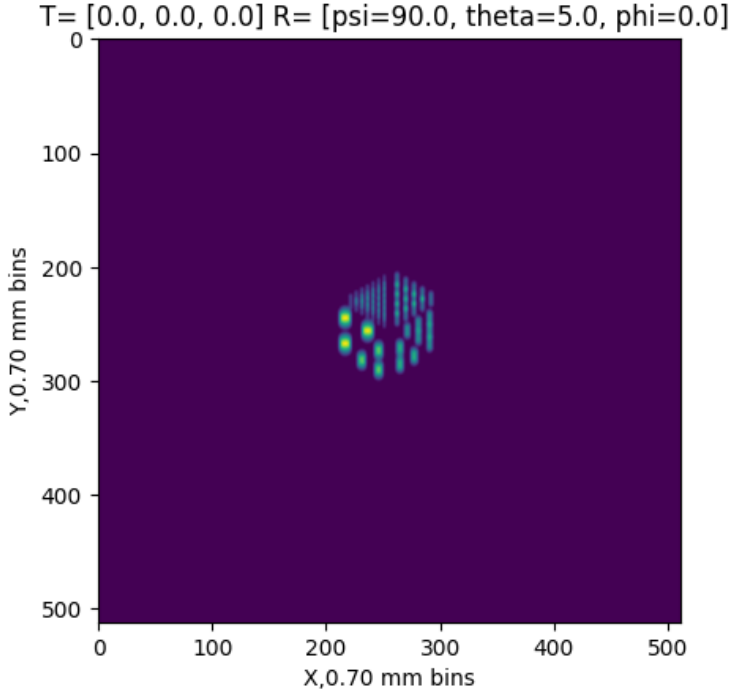
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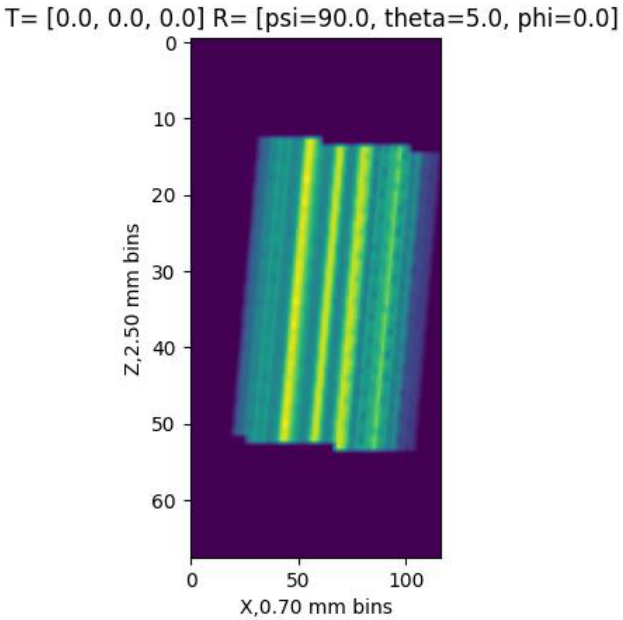
Y,0.70 mm bins
X,0.70 mm bins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Z,2.50 mm bins
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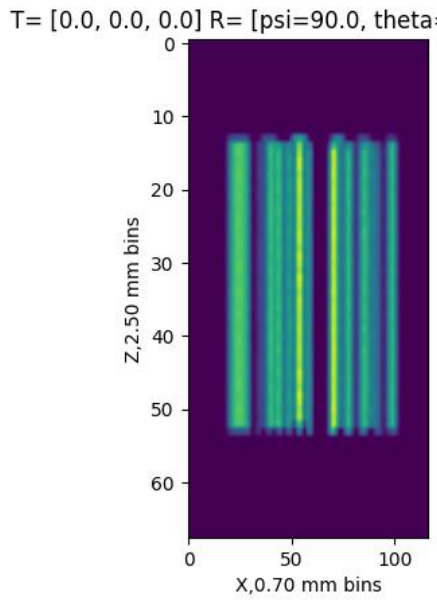
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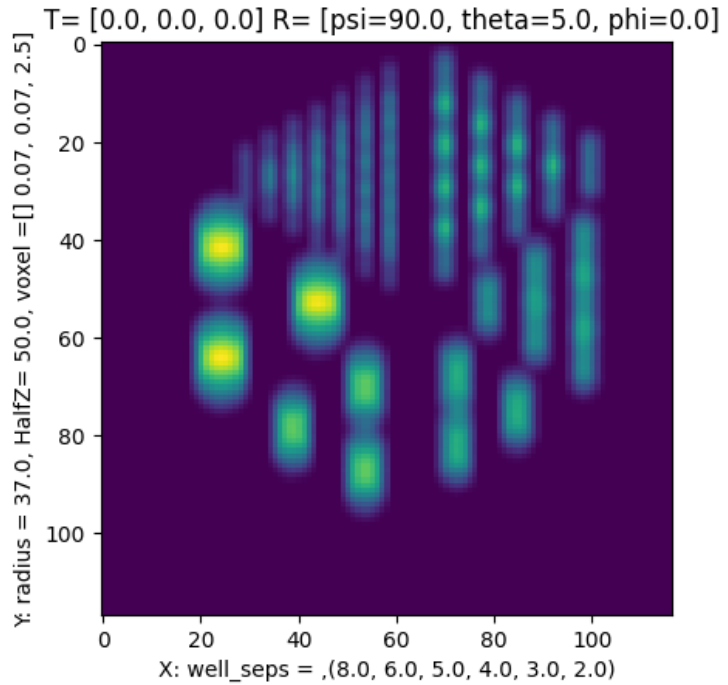
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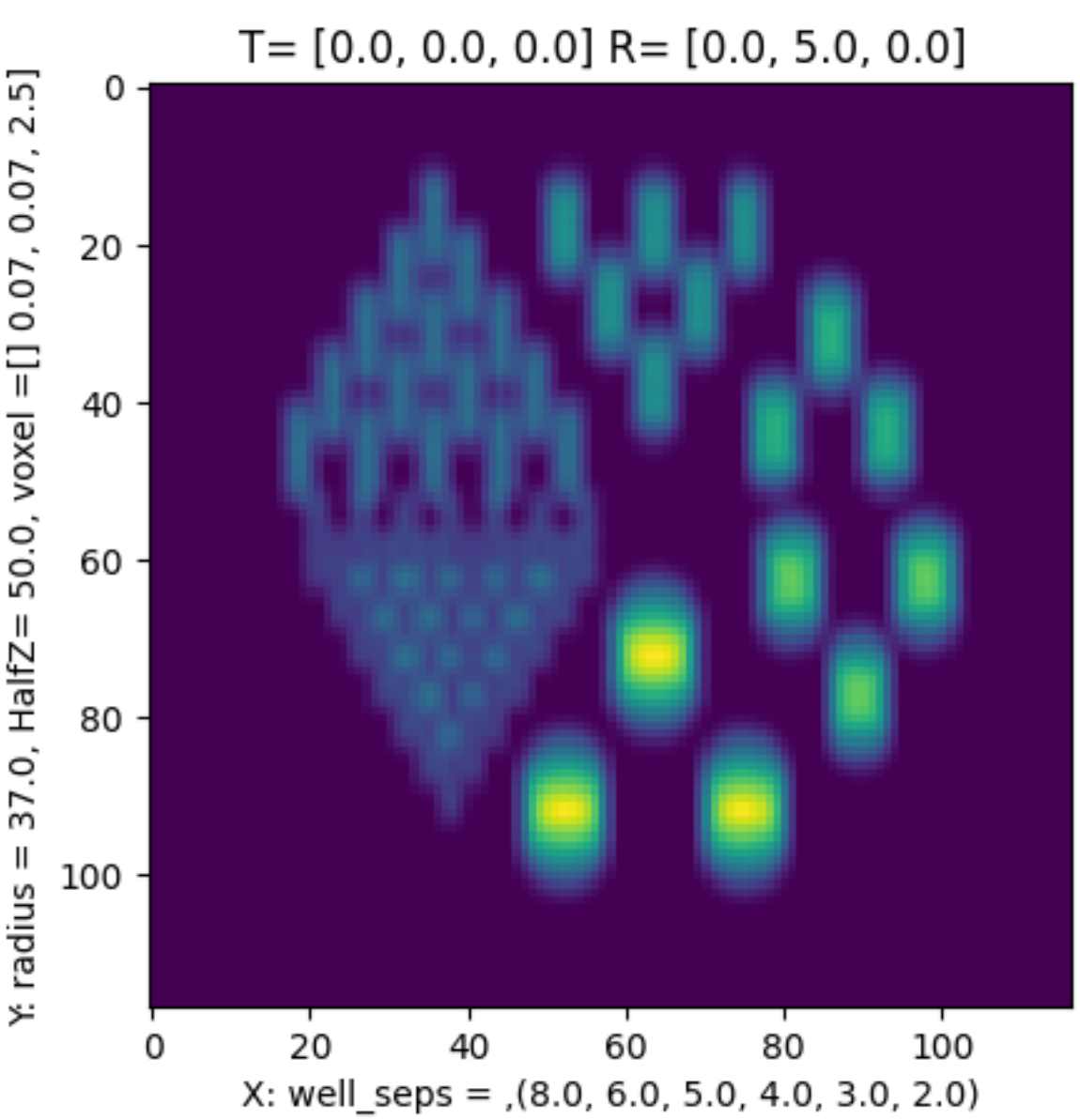
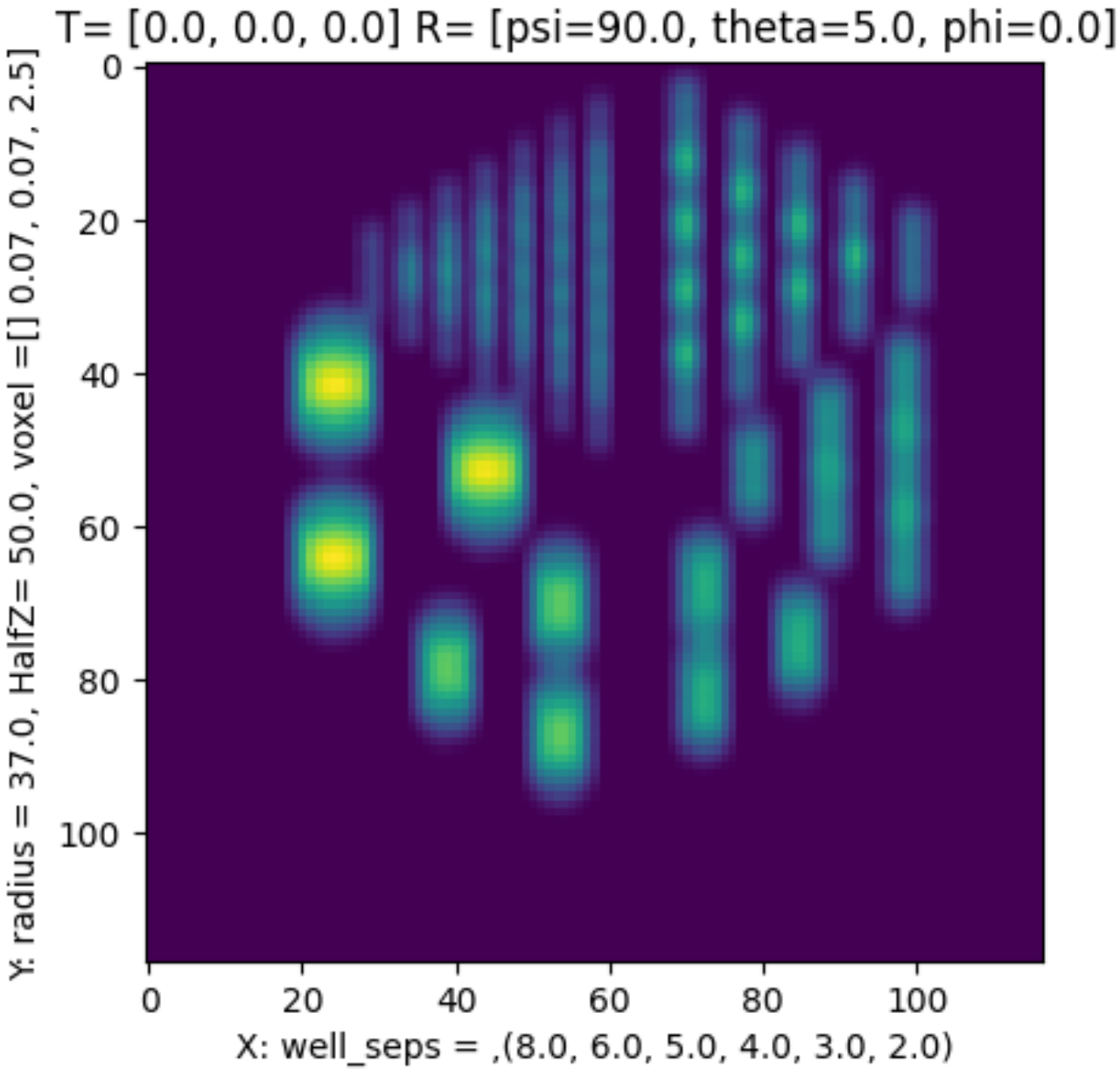
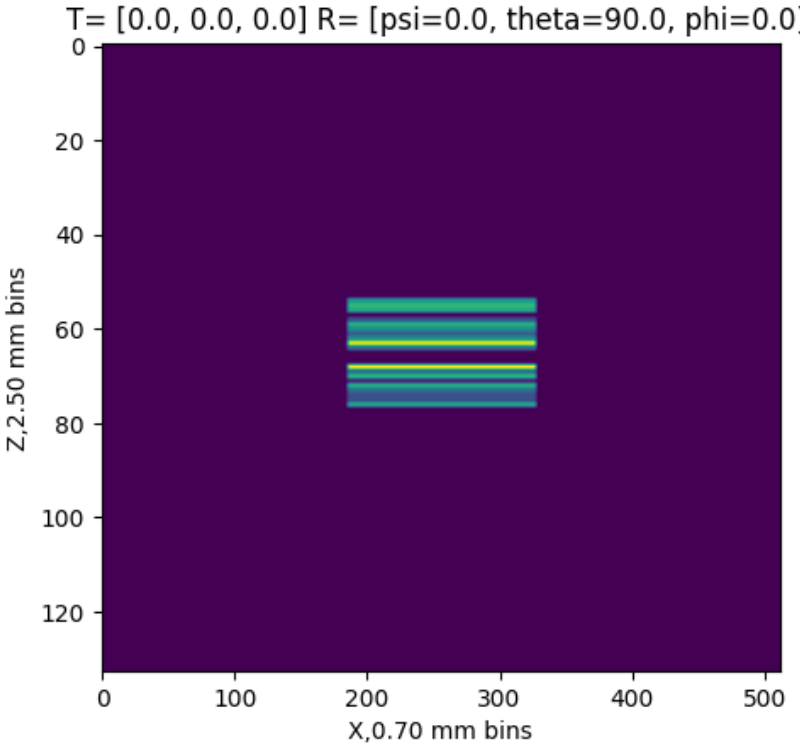
iCheckRotations.ipynb

First rotation in lab frame is about phantom axis

Second rotation in lab frame sets phantom axis altitude



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Z,2.50 mm bins
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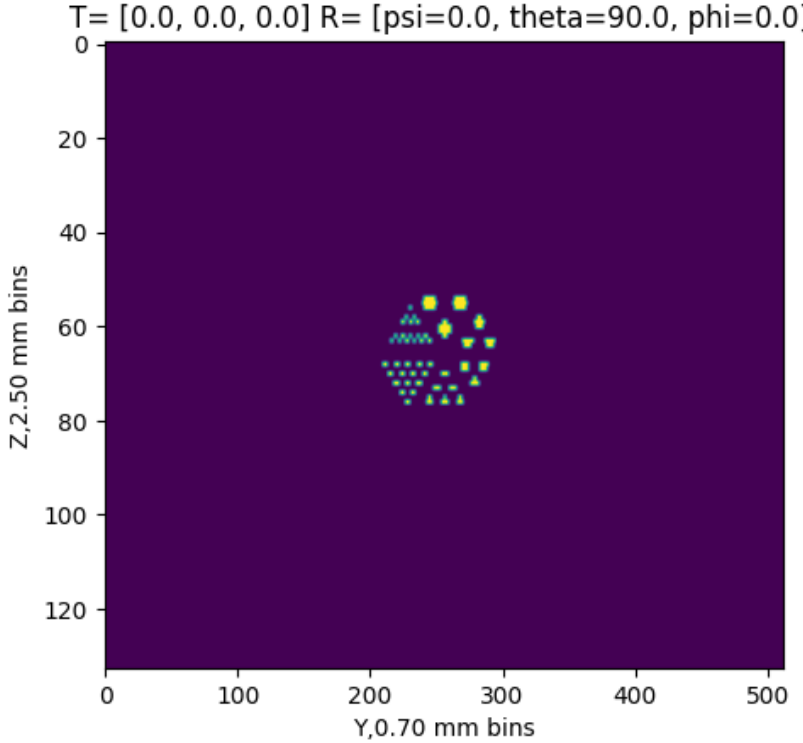
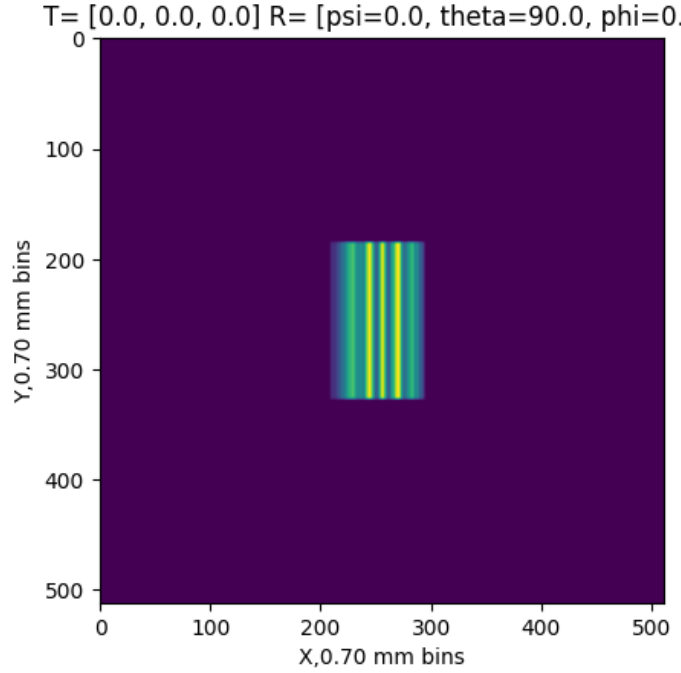

T= [0.0, 0.0, 0.0] R= [psi=0.0, theta=90.0, phi=0.0]
Z,2.50 mm bins
Y,0.70 mm bins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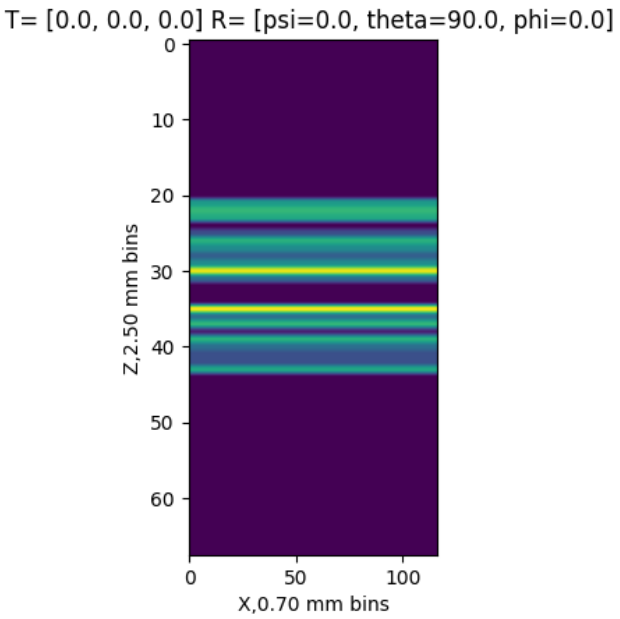
Y,0.70 mm bins
X,0.70 mm bins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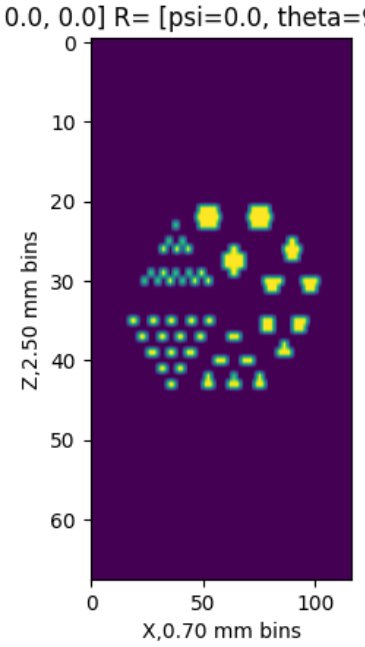
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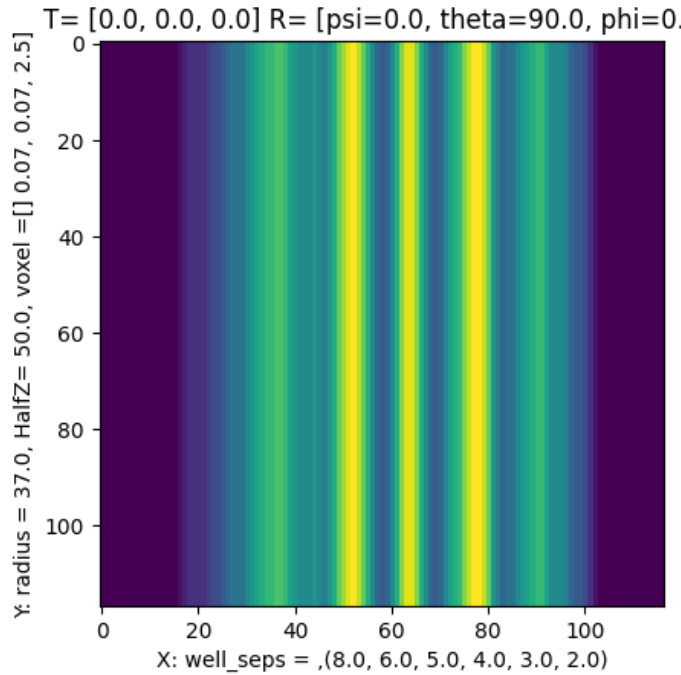
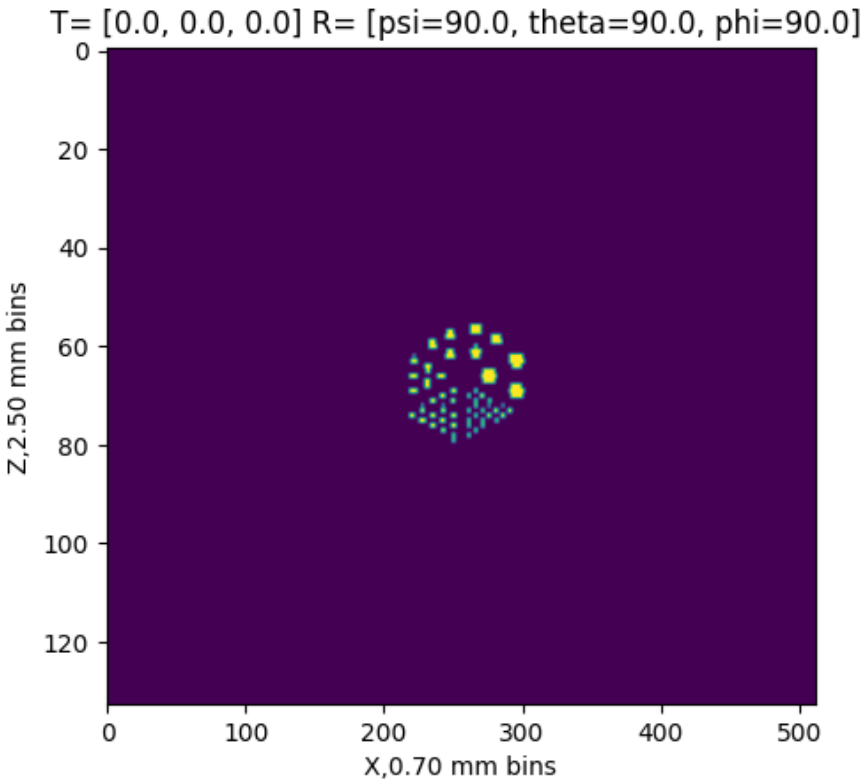
Z,2.50 mm bins
X,0.70 mm bins


T= [0.0, 0.0, 0.0] R= [psi=0.0, theta=90.0, phi=0.0]
Y: radius = 37.0, HalfZ= 50.0, voxel =[] 0.07, 0.07, 2.5]
X: well_seps = ,(8.0, 6.0, 5.0, 4.0, 3.0, 2.0)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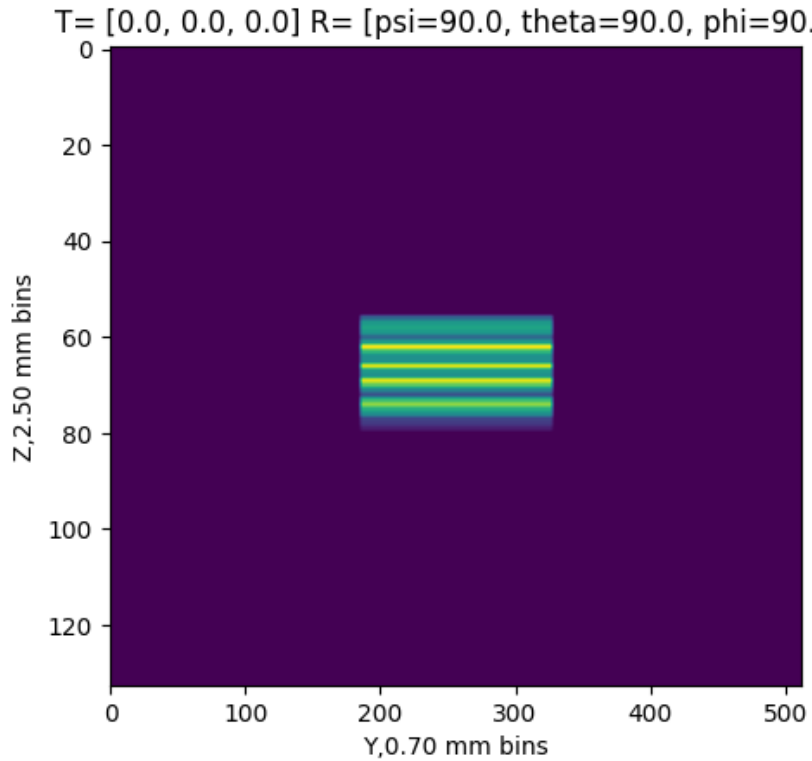
Z,2.50 mm bins
X,0.70 mm bins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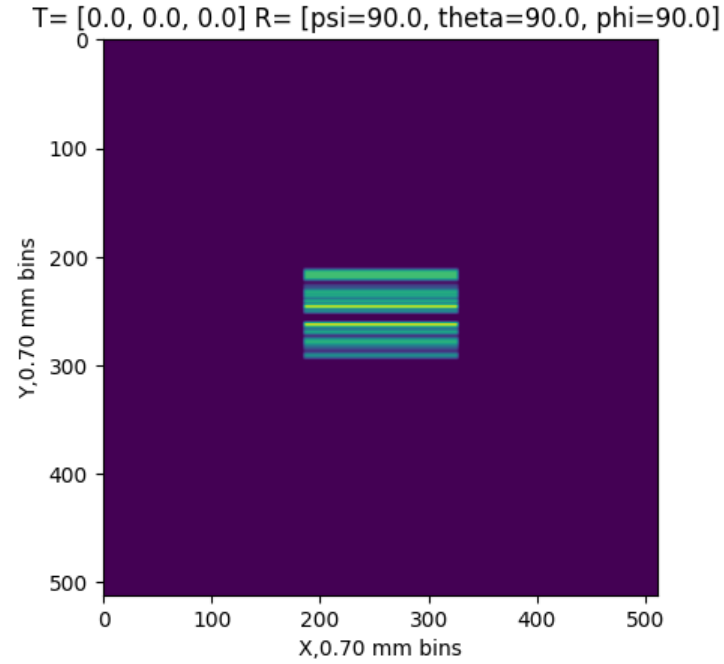
Y,0.70 mm bins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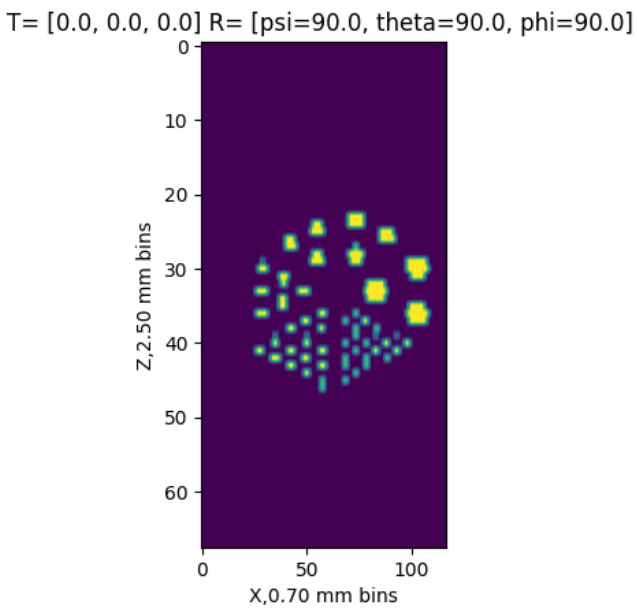
Y,0.70 mm bins
X,0.70 mm bins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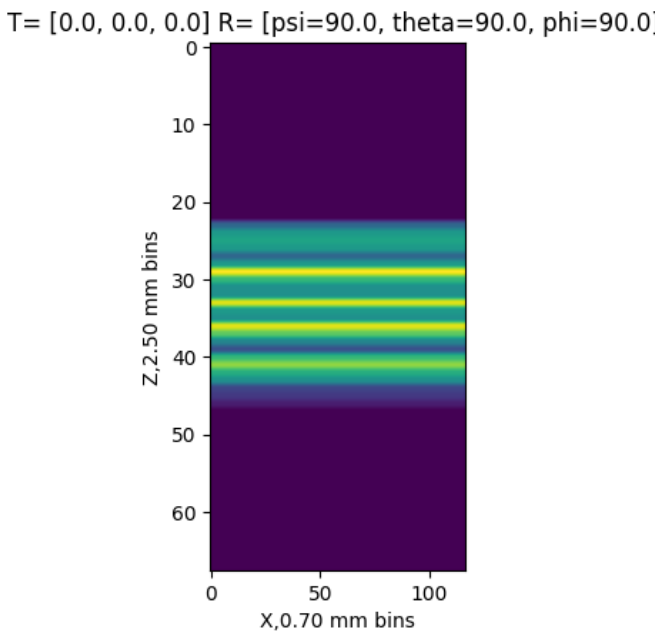
Z,2.50 mm bins
X,0.70 mm bins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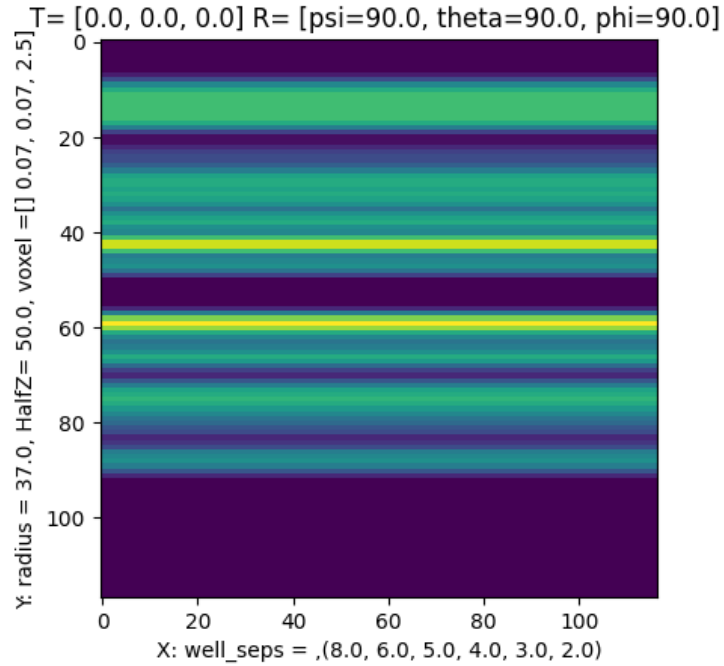
Z,2.50 mm bins
X,0.70 mm bins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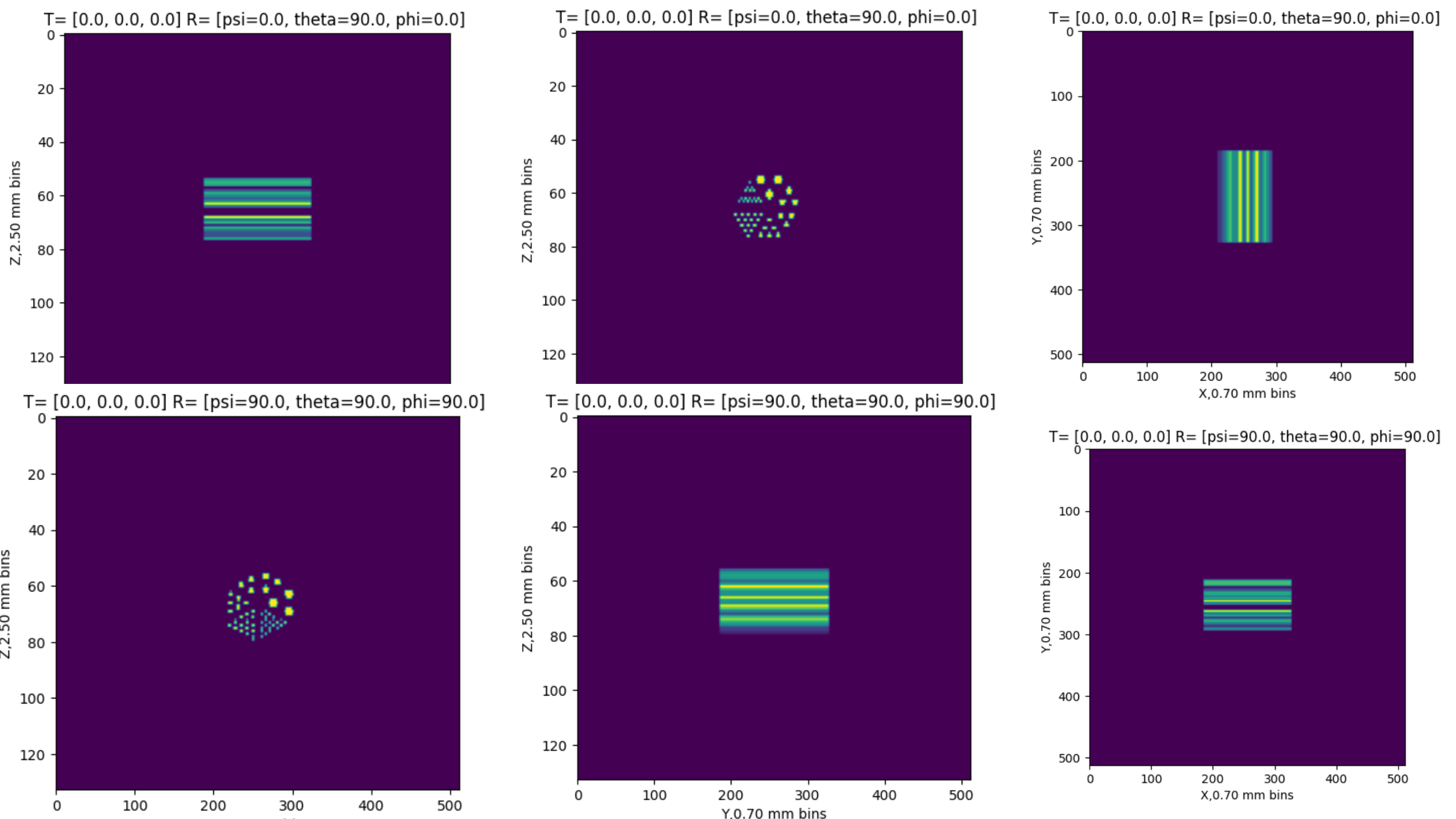
Y: radius = 37.0, HalfZ= 50.0, voxel =[] 0.07, 0.07, 2.5]
X: well_seps = ,(8.0, 6.0, 5.0, 4.0, 3.0, 2.0)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Z,2.50 mm bins
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Z,2.50 mm bins
T= [0.0, 0.0, 0.0] R= [psi=0.0, theta=90.0, phi=0.0]
Y,0.70 mm bins
X,0.70 mm bins
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Z,2.50 mm bins
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Z,2.50 mm bins
Y,0.70 mm bins
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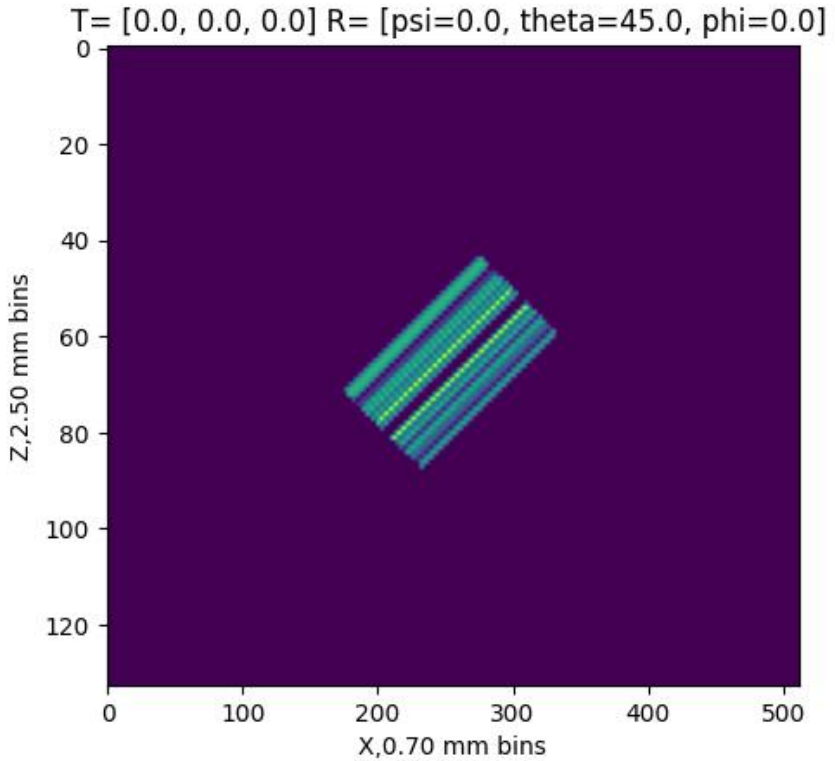
Y,0.70 mm bins
X,0.70 mm bins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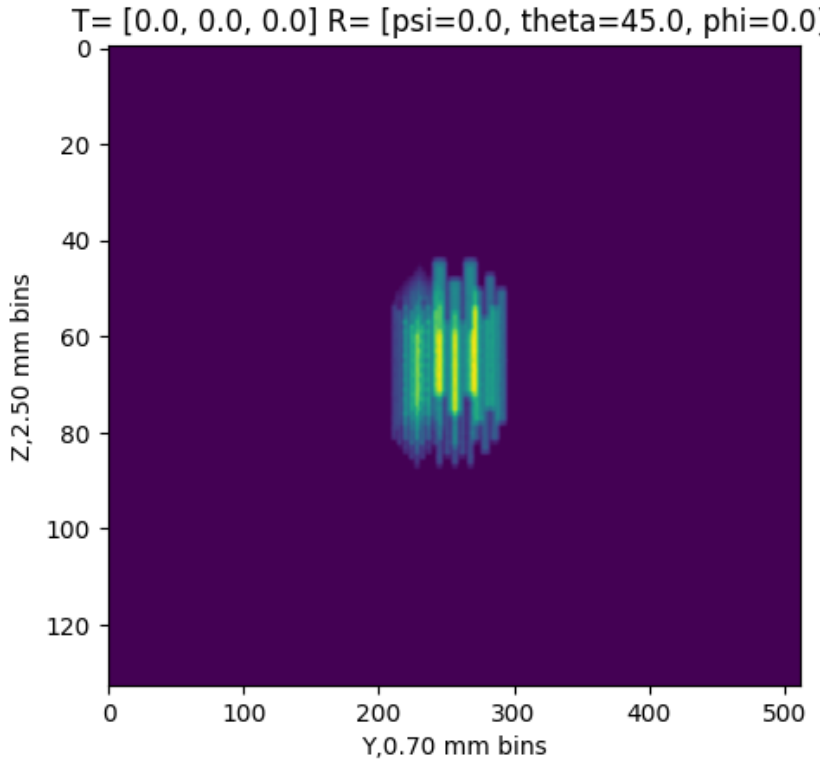
Z,2.50 mm bins
X,0.70 mm bins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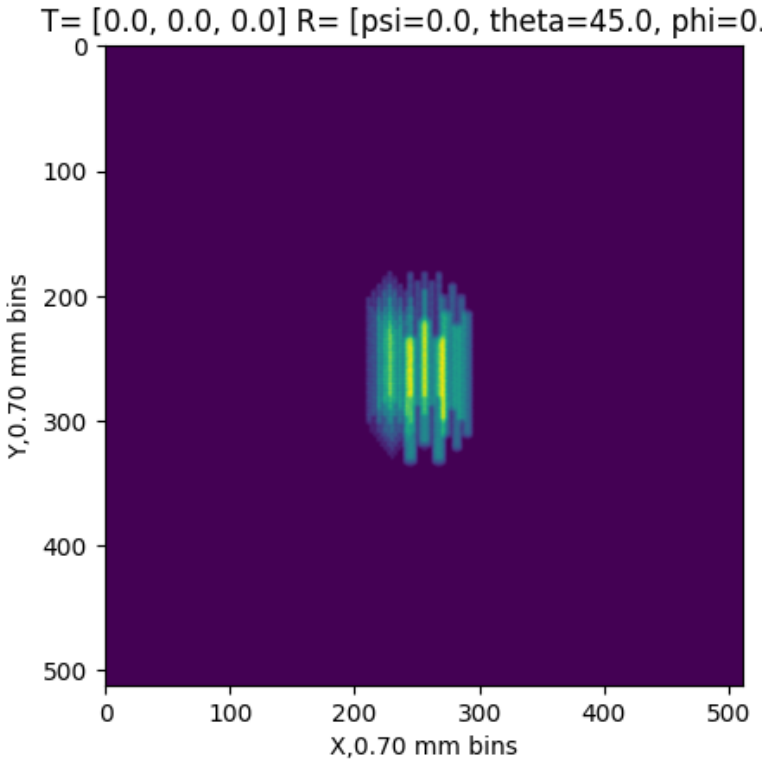
Z,2.50 mm bins
Y,0.70 mm bins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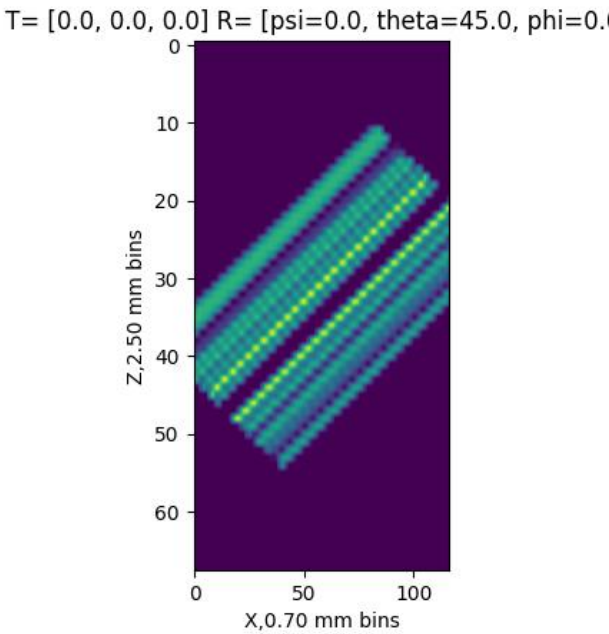
Y,0.70 mm bins
X,0.70 mm bins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Z,2.50 mm bins
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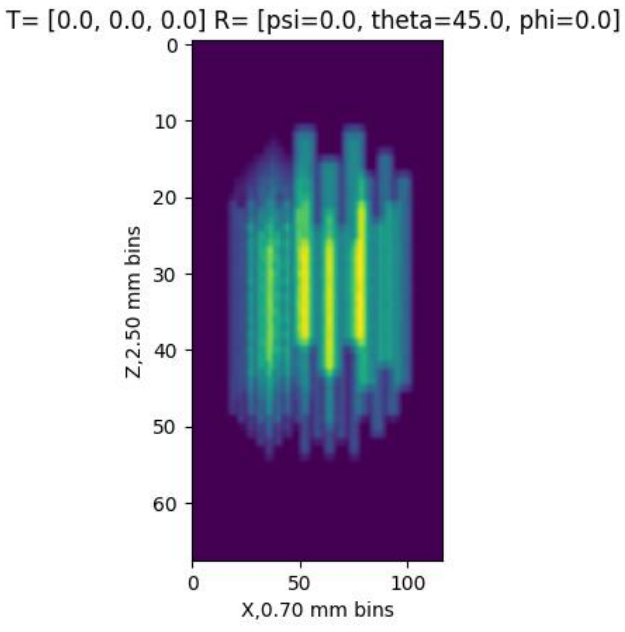
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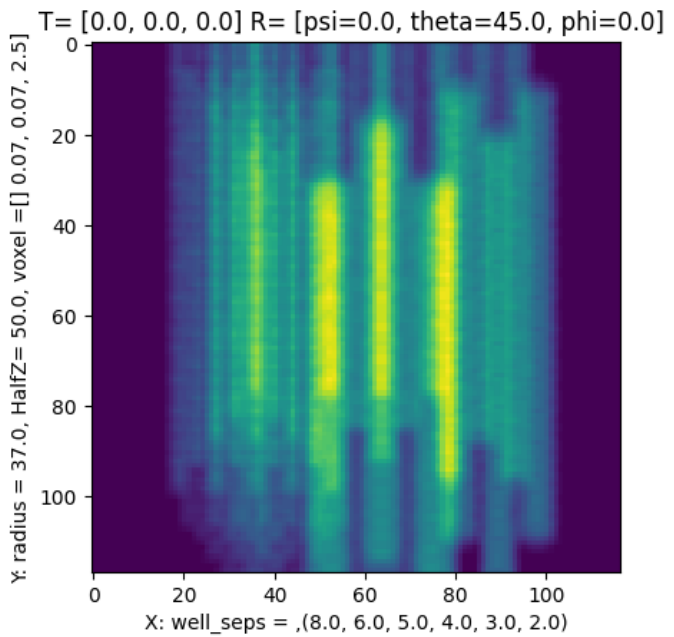
Z,2.50 mm bins
X,0.70 mm bins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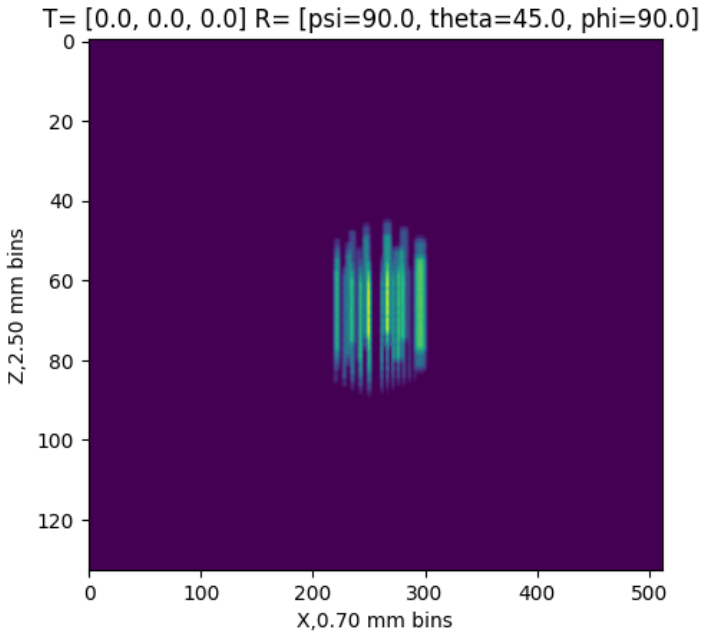
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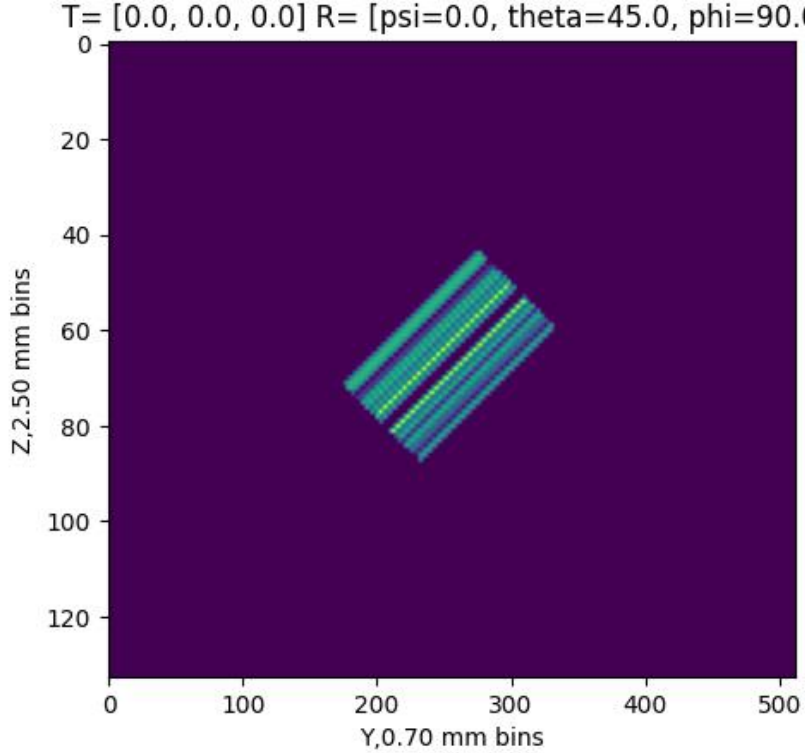
Z,2.50 mm bins
X,0.70 mm bins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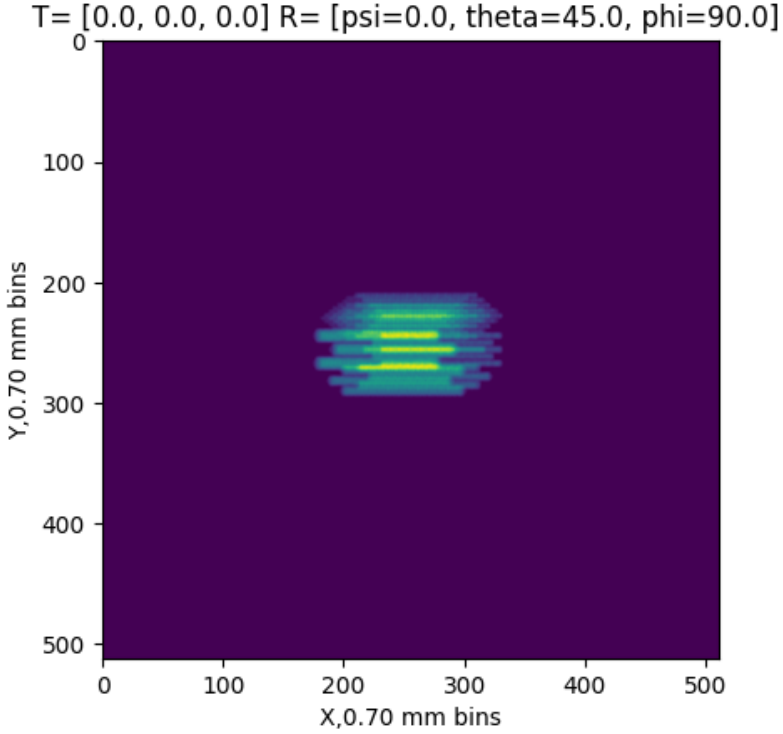
Z,2.50 mm bins
Y,0.70 mm bins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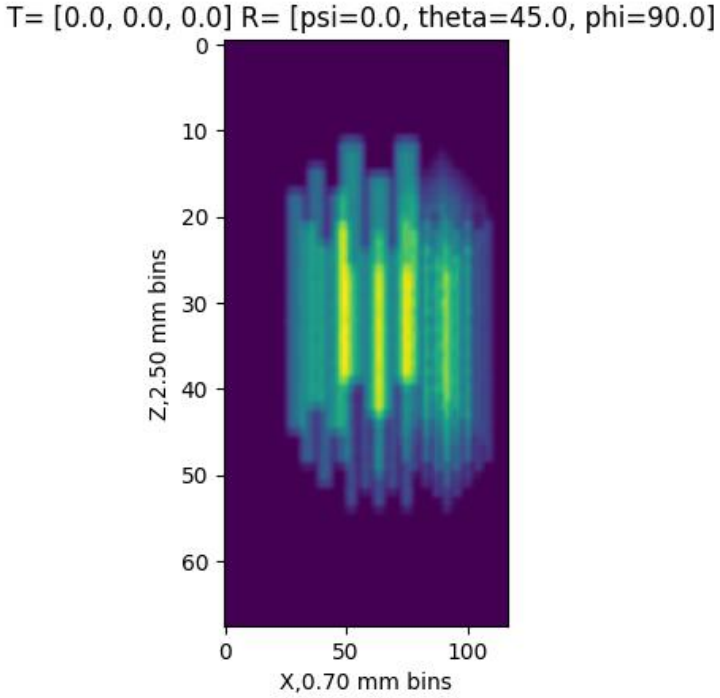
Y,0.70 mm bins
X,0.70 mm bins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Z,2.50 mm bins
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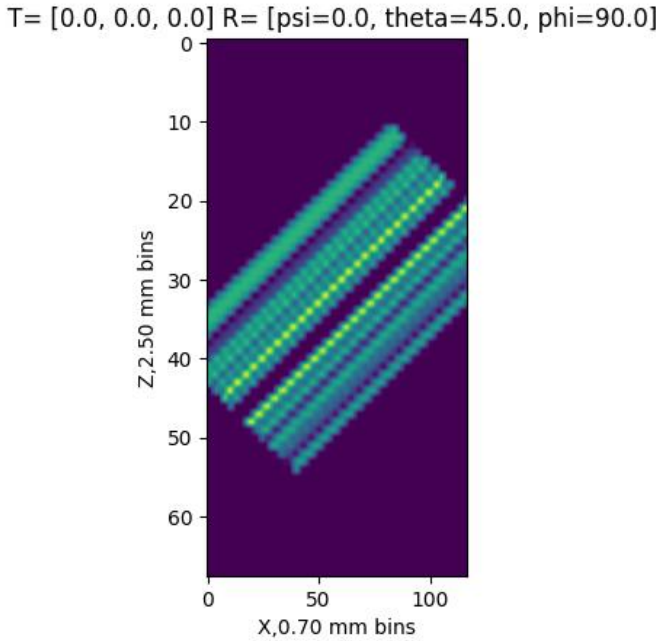
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Z,2.50 mm bins
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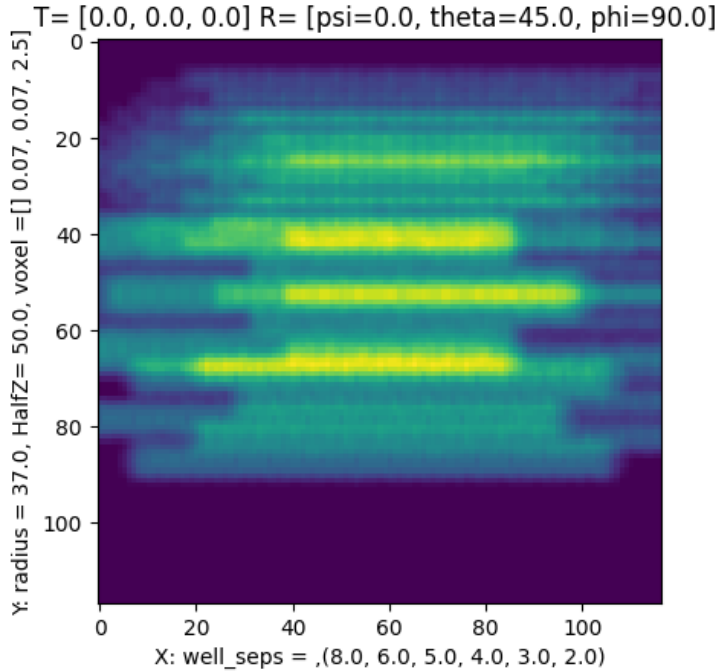
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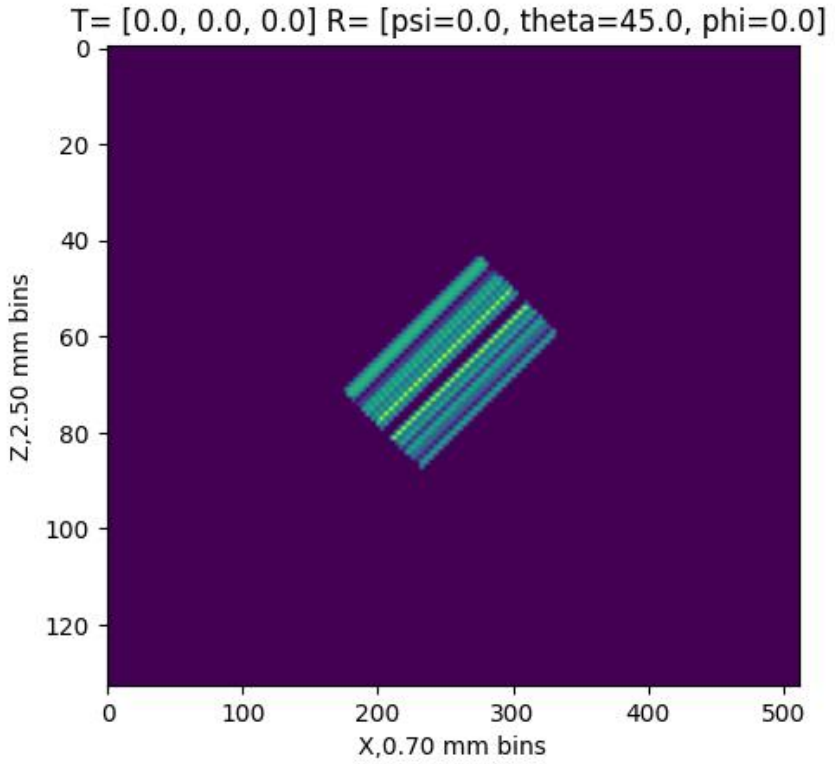
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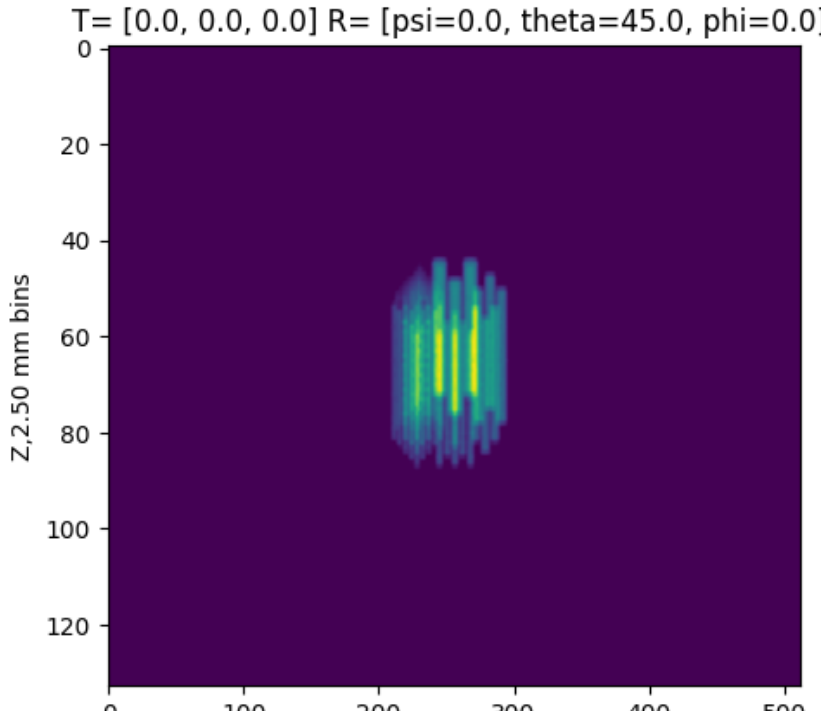
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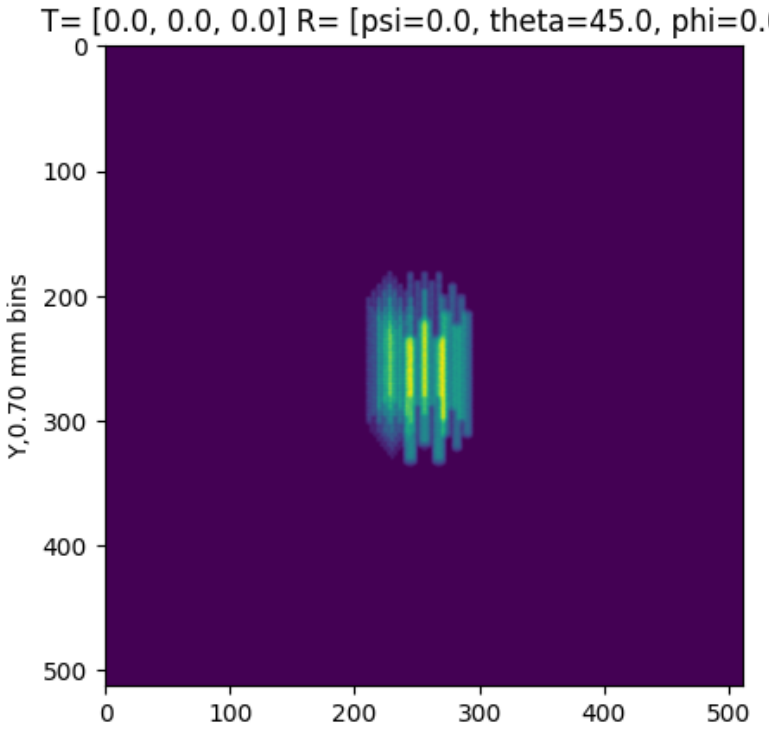
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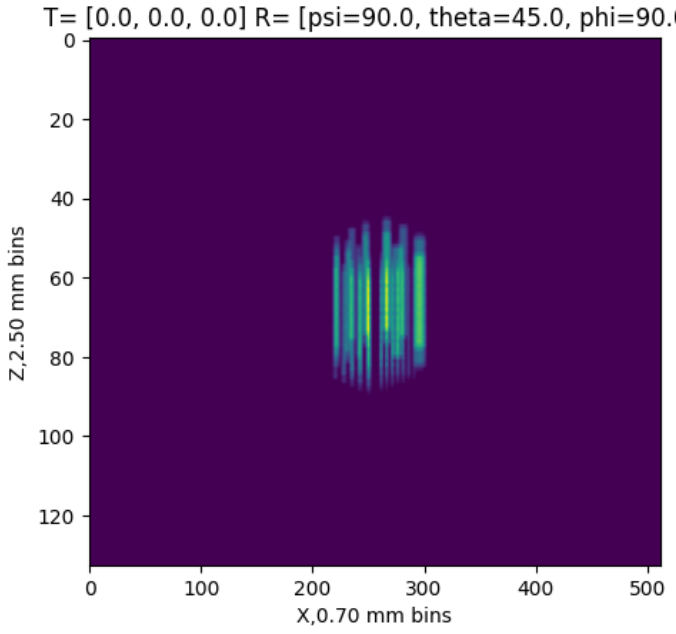
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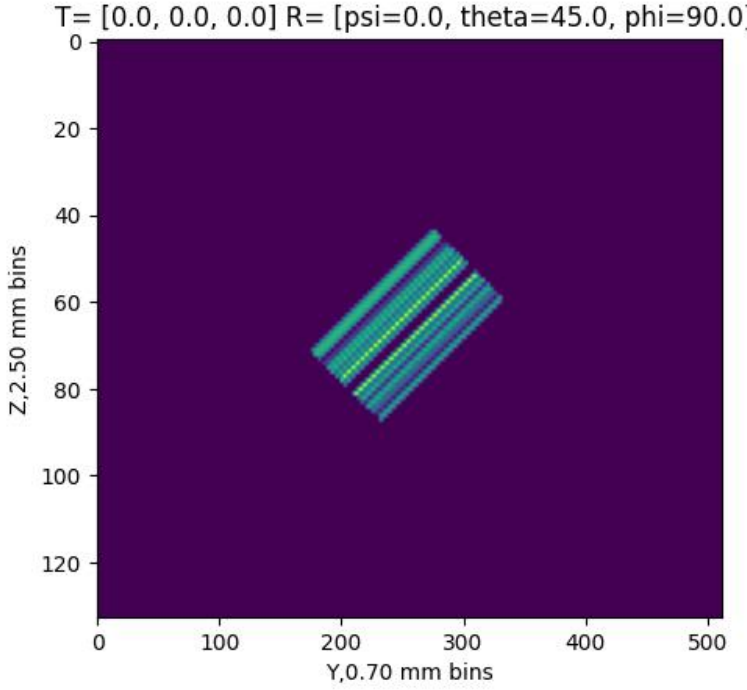
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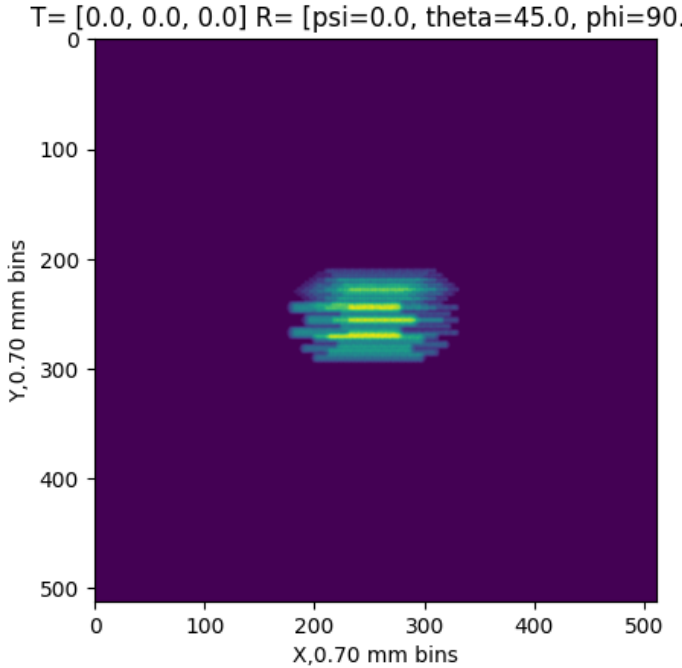
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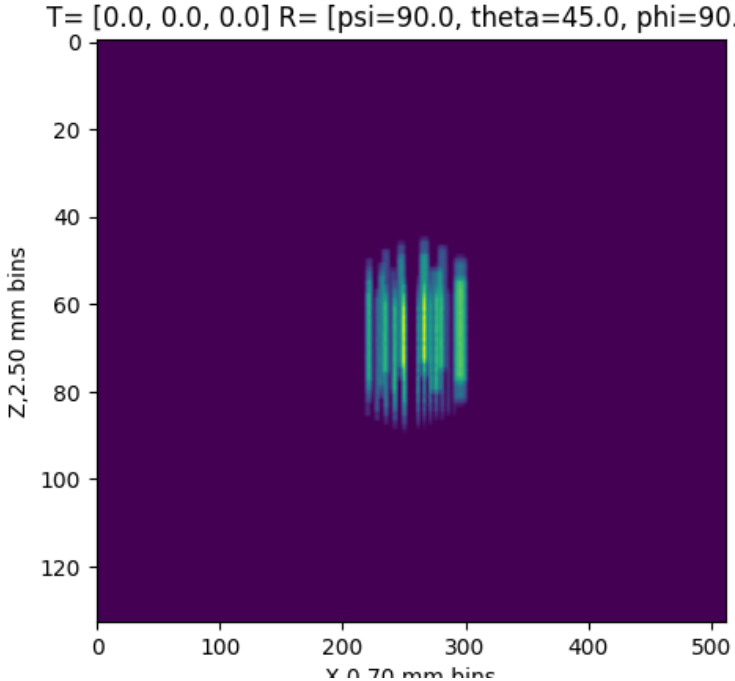
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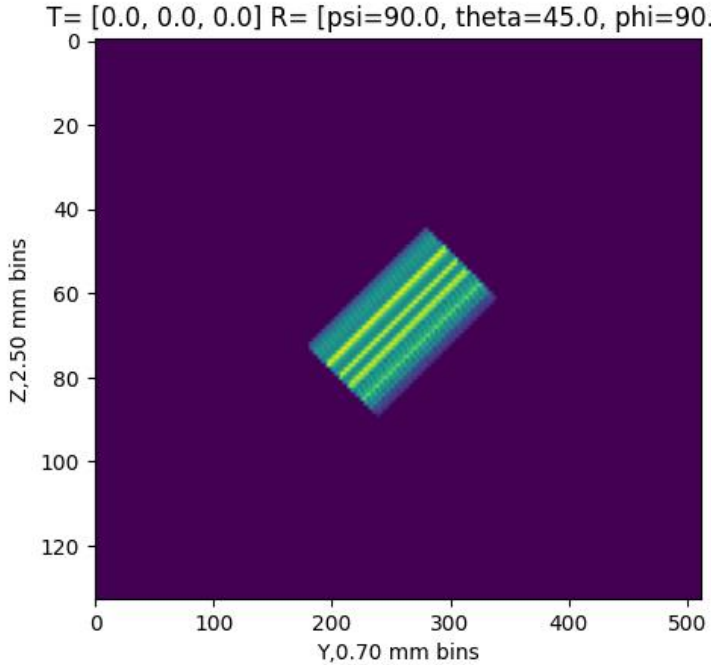
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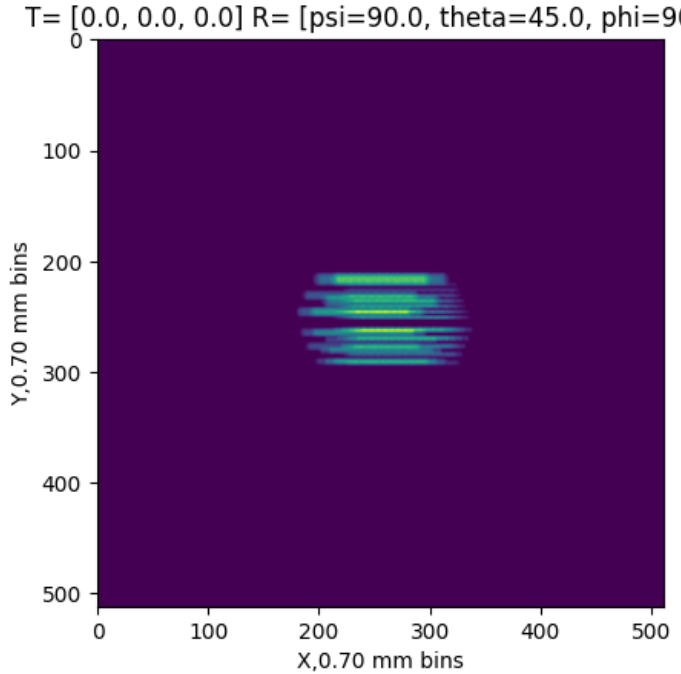
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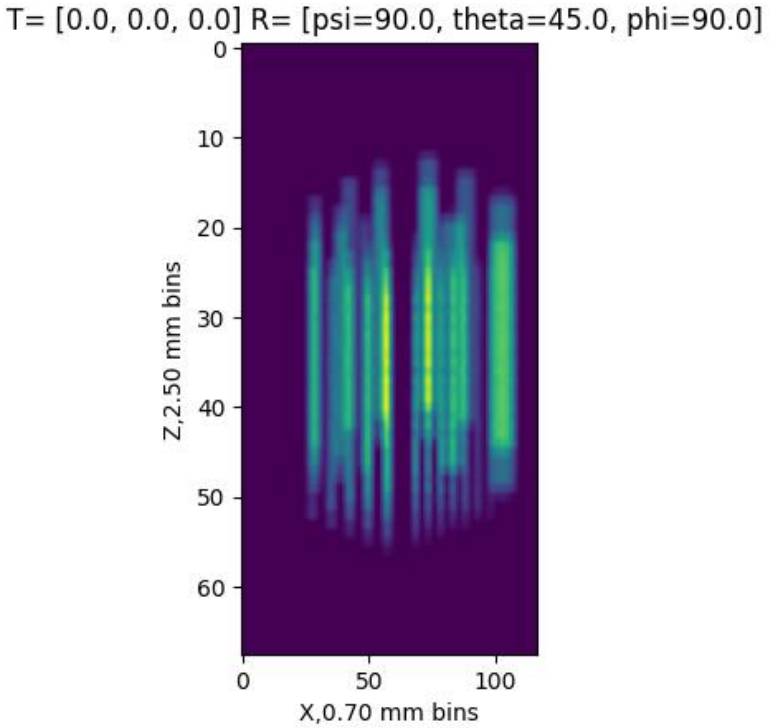
X,0.70 mm bins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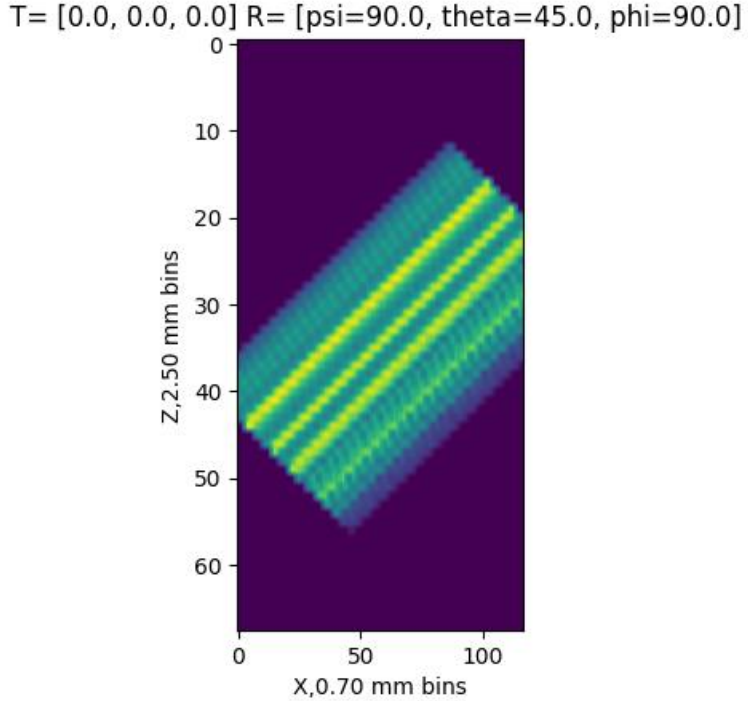
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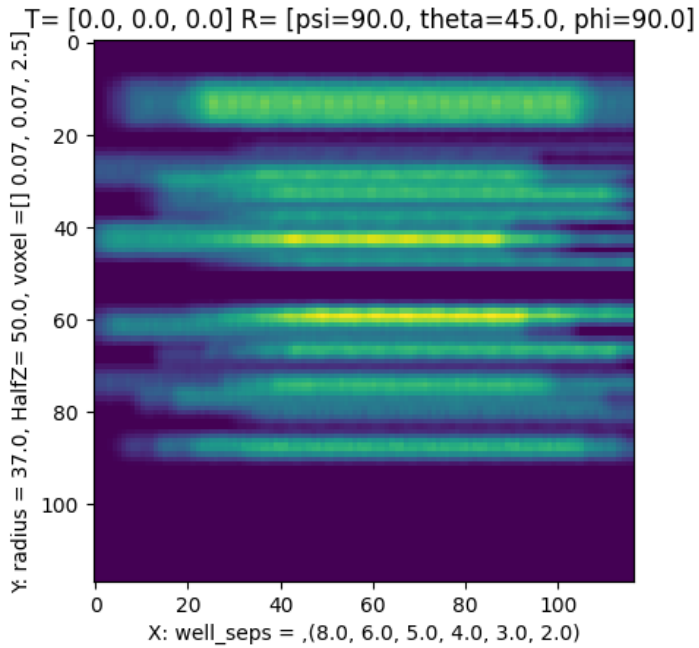
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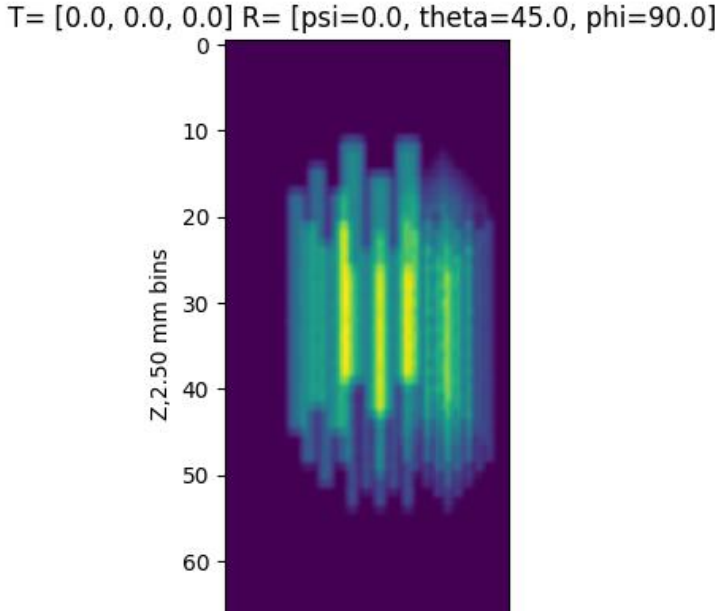
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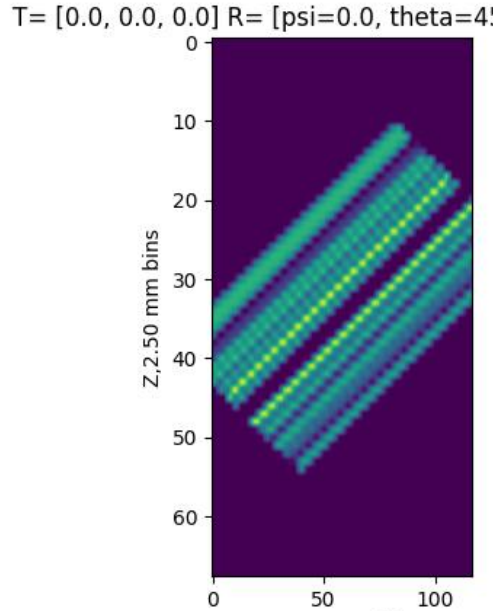
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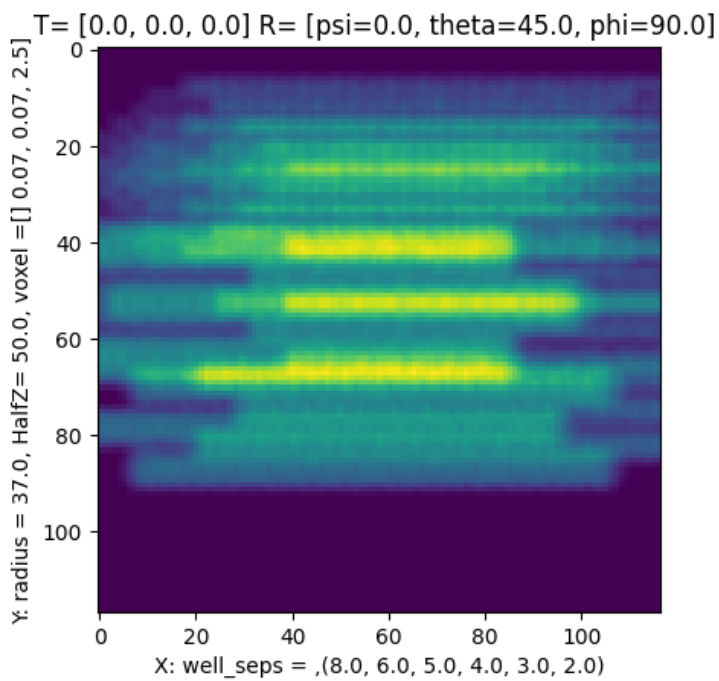
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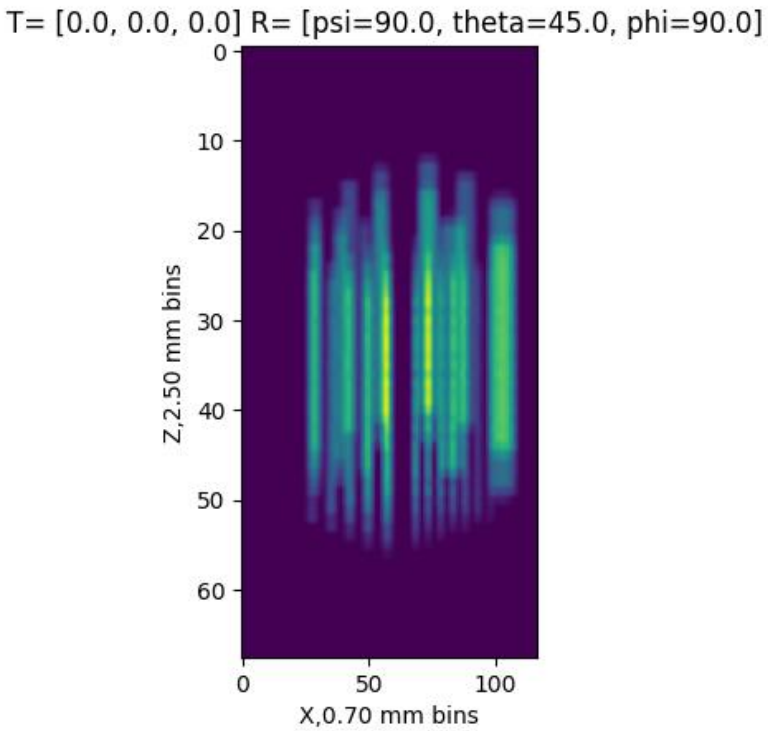
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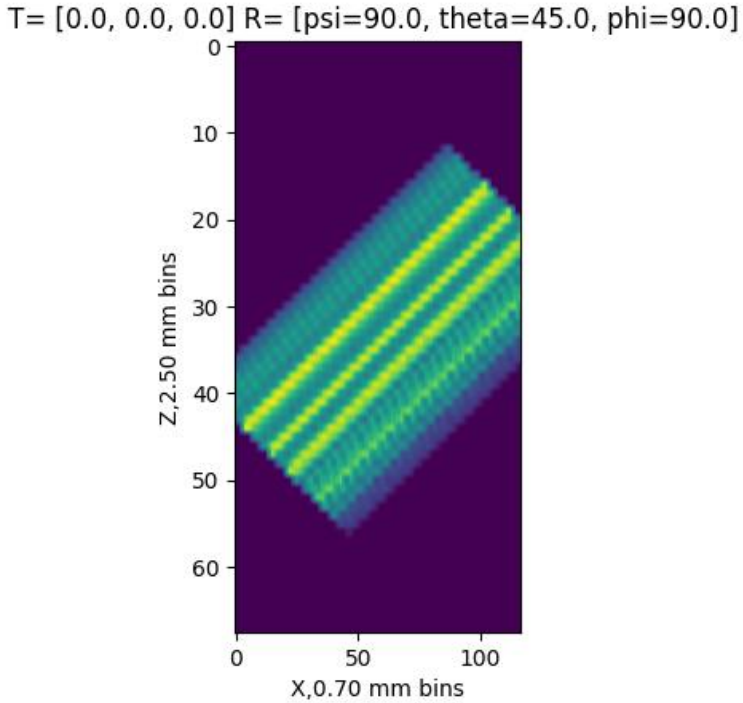
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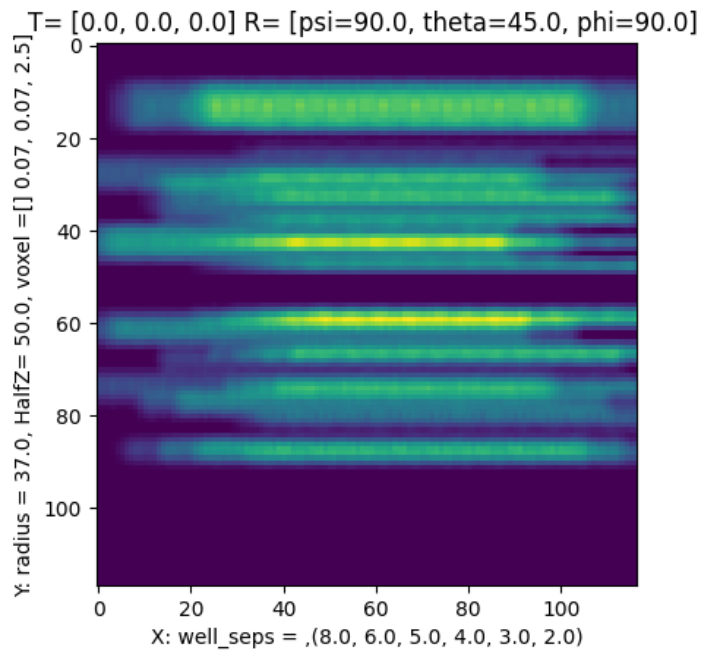
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