viz

March 29, 2023

```python
import matplotlib.pyplot as plt
import numpy as np
import sdf
import re
import glob
plt.rcParams["font.size"] = 14
plt.rcParams["figure.figsize"] = (10, 8)
```

```python
DATA_DIR = "12run"
ALL_FILES = glob.glob(f"{DATA_DIR}/*sdf")
ALL_FILES.sort()
POINTS = len(ALL_FILES)
```
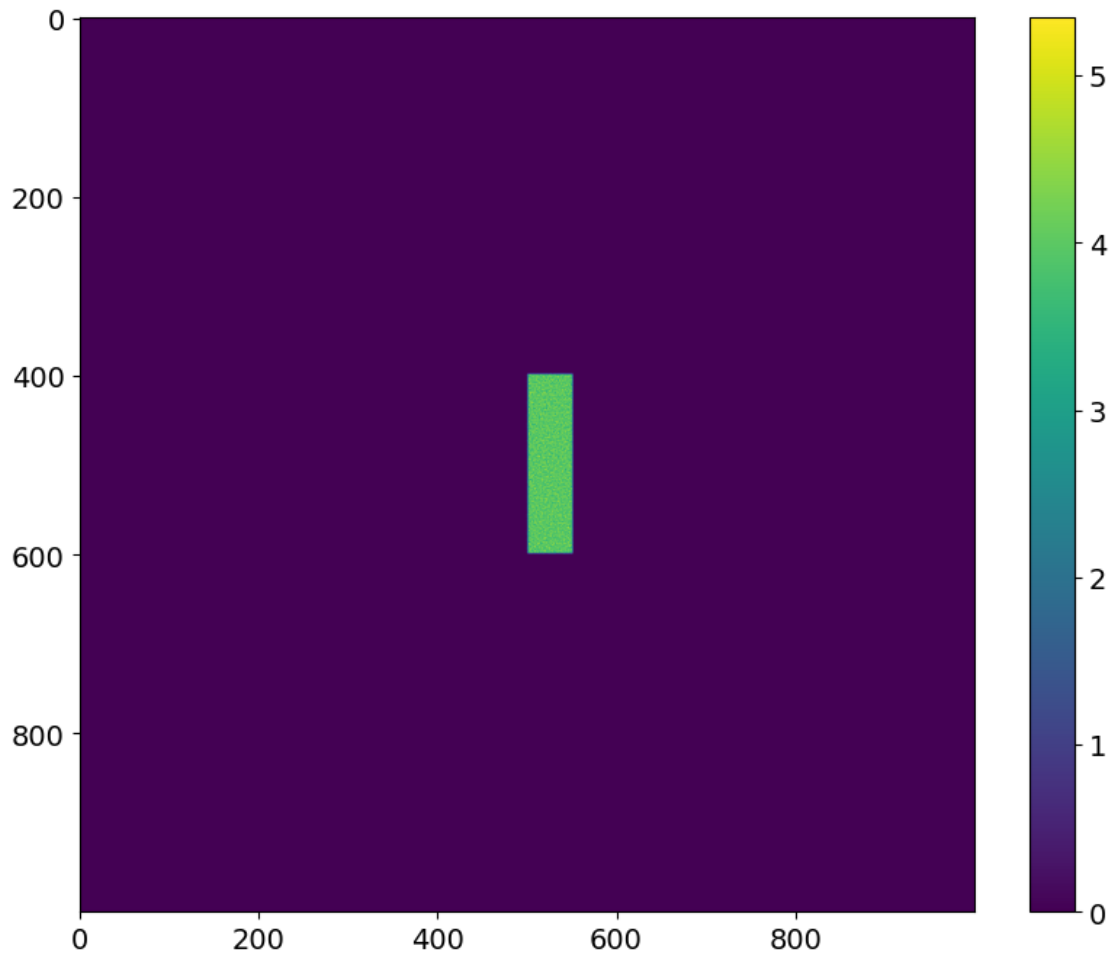
```python
EXTENT = [-10,10, -10, 10]
```

```python
raw_data = sdf.read(ALL_FILES[0])
```

```python
lambd = 1e-6
c = 3e8
omega = 2*np.pi*c/lambd
n_c = omega*omega/(4*np.pi*np.pi*81)
```

```python
plt.imshow(raw_data.Derived_Number_Density_Electron.data.T/n_c)
plt.colorbar()
```

```
<matplotlib.colorbar.Colorbar at 0x7ff1897fbbe0>
```

```
def plot_field(data_dir, ax, component="y"):
    raw_data = sdf.read(data_dir)
    comp = {
        "x":raw_data.Electric_Field_Ex,
        "y":raw_data.Electric_Field_Ey,
        "z":raw_data.Electric_Field_Ez,
    }
    field = comp[component].data.T
    t = raw_data.Header['time']*1e15
    field = field/(field.max()+1e-10)
    ax.imshow(field**2, cmap='jet', origin='lower',
    extent=EXTENT,
    aspect='auto',
    # interpolation='nearest',
    )
    ax.set_xlabel('$x \, [\mu m]$')
    ax.set_ylabel('$y \, [\mu m]$')
```

```
    ax.set_title(f't = {t:.1f} fs')
```

```
[ ]: def get_field(id, component):
         raw_data = sdf.read(ALL_FILES[id])
         comp = {
             "x":raw_data.Electric_Field_Ex,
             "y":raw_data.Electric_Field_Ey,
             "z":raw_data.Electric_Field_Ez,
         }
         field = comp[component].data.T
         return field
```

```
[ ]: # plot_field(ALL_FILES[0], plt.gca(), component="y")
```

```
[ ]: fig, ax = plt.subplots(4, 2, figsize=(25, 22))
     ax = ax.flatten()
     i = 0
     for dir in ALL_FILES:
         plot_field(dir, ax[i], component="y")
         i += 1
         if i == 8:
             break
```

t = 0.0 fs   t = 10.0 fs   t = 20.0 fs   t = 30.0 fs   t = 40.0 fs   t = 50.0 fs   t = 60.0 fs   t = 66.7 fs

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