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Paul Moeller

Zgoubi Workshop, Boulder CO
2019-08-30

Supported in part by the US Department of Energy, Office of Science,Office of Nuclear Physics, including Award No. DE-SC0017181.

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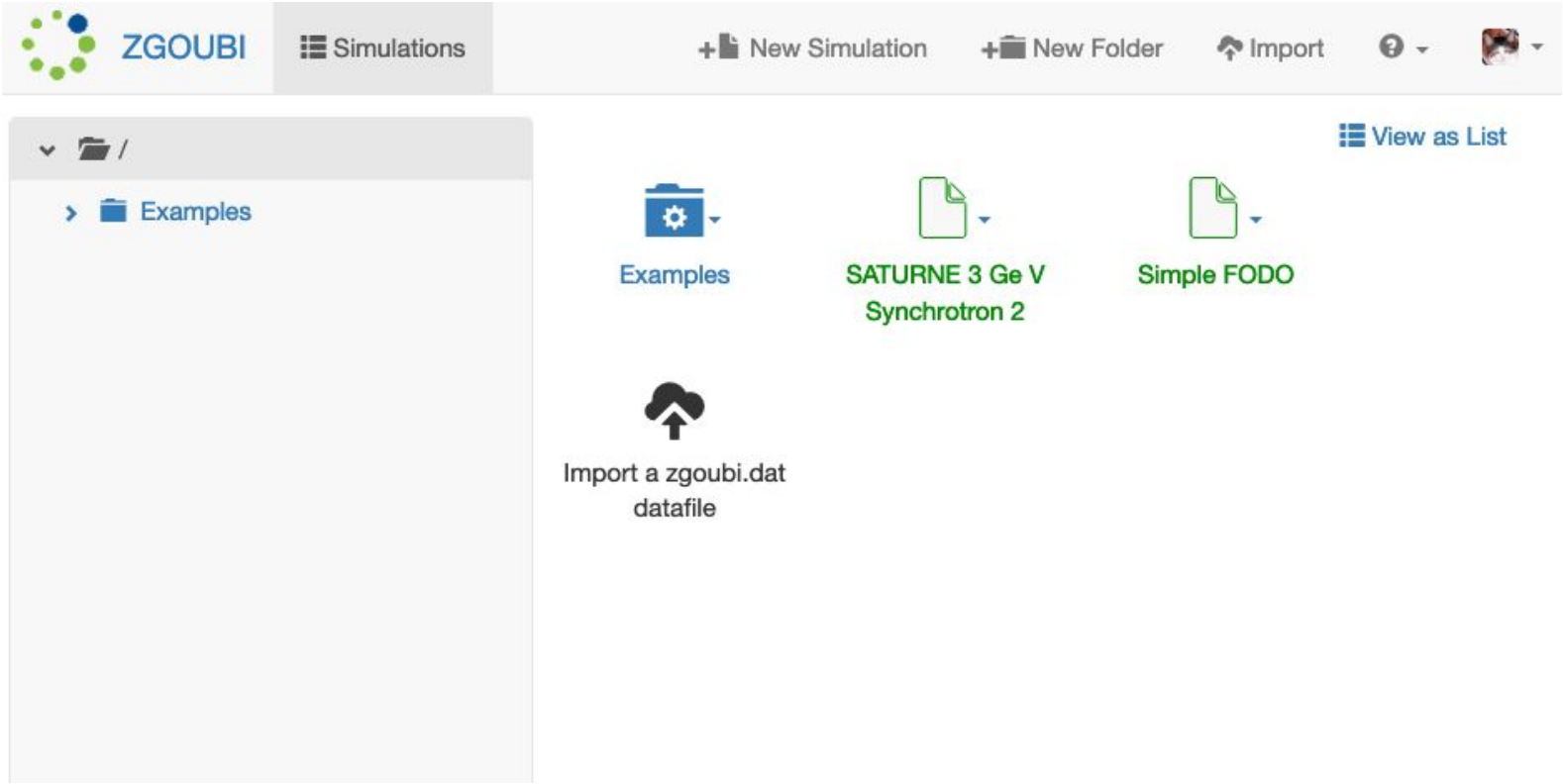
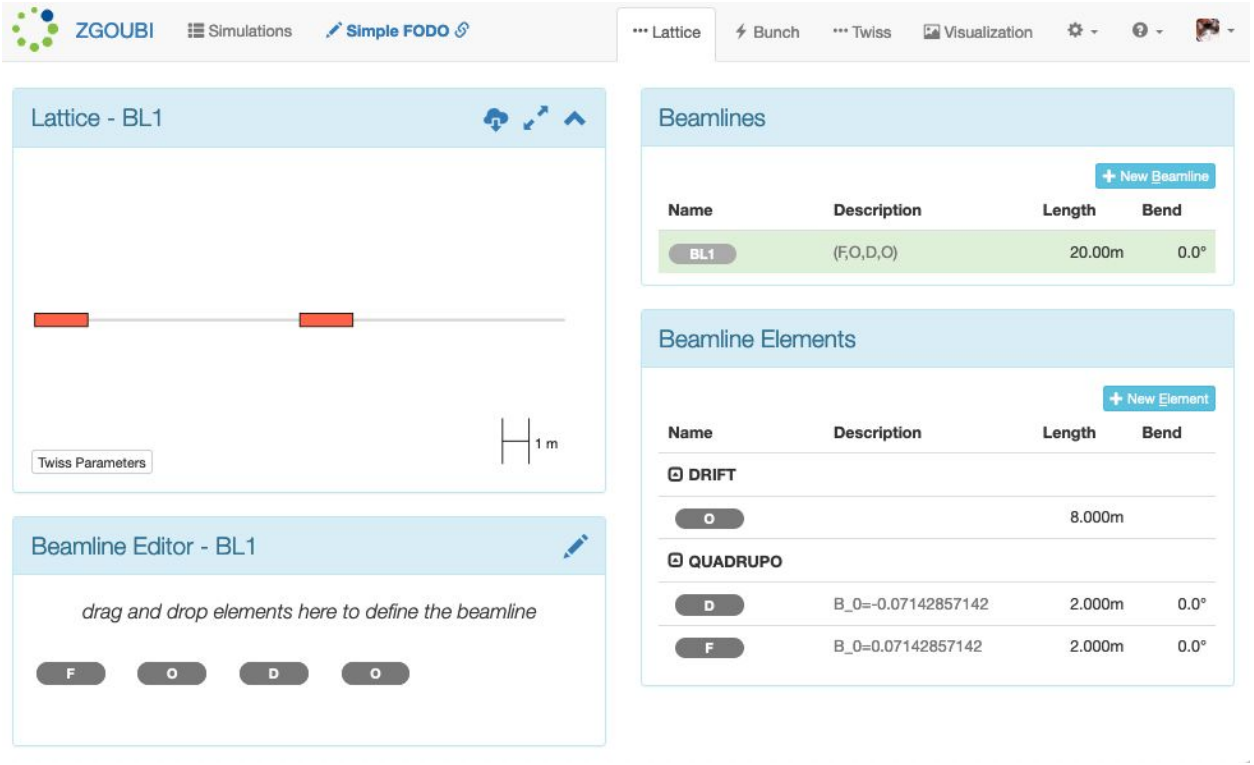
FODO example



FODO example: Lattice



Create BL1 beamline.

8m Drift

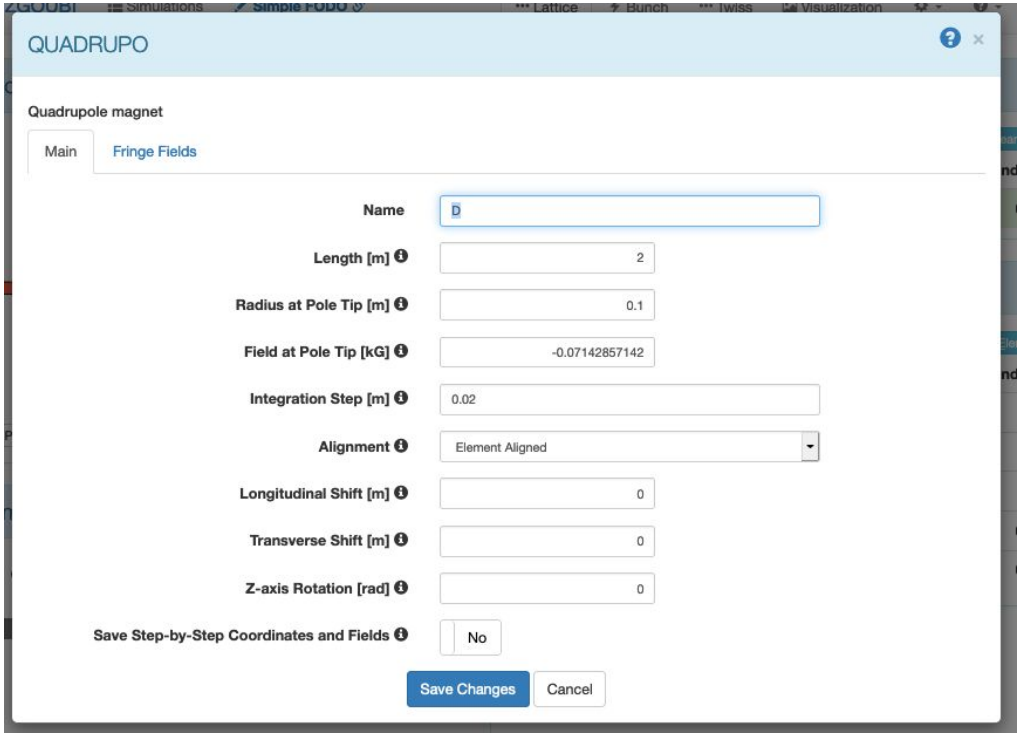
2m Quads with

B_0: 0.07142857142

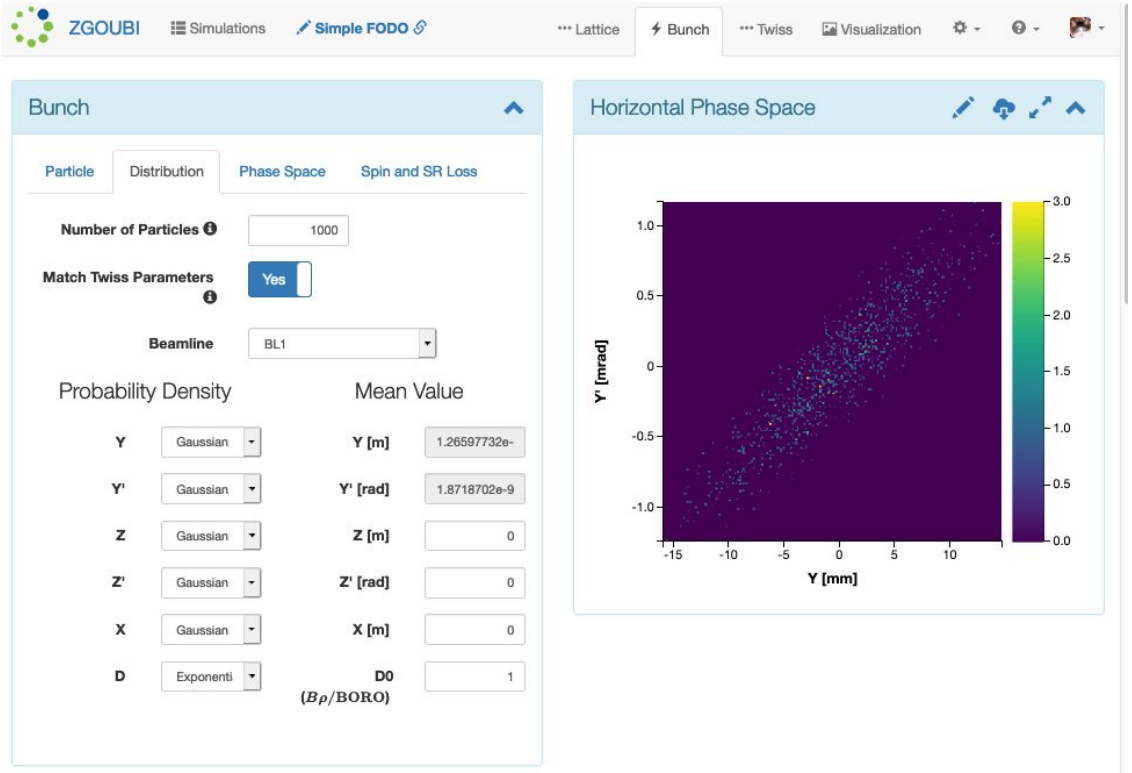
and

B_0: -0.07142857142

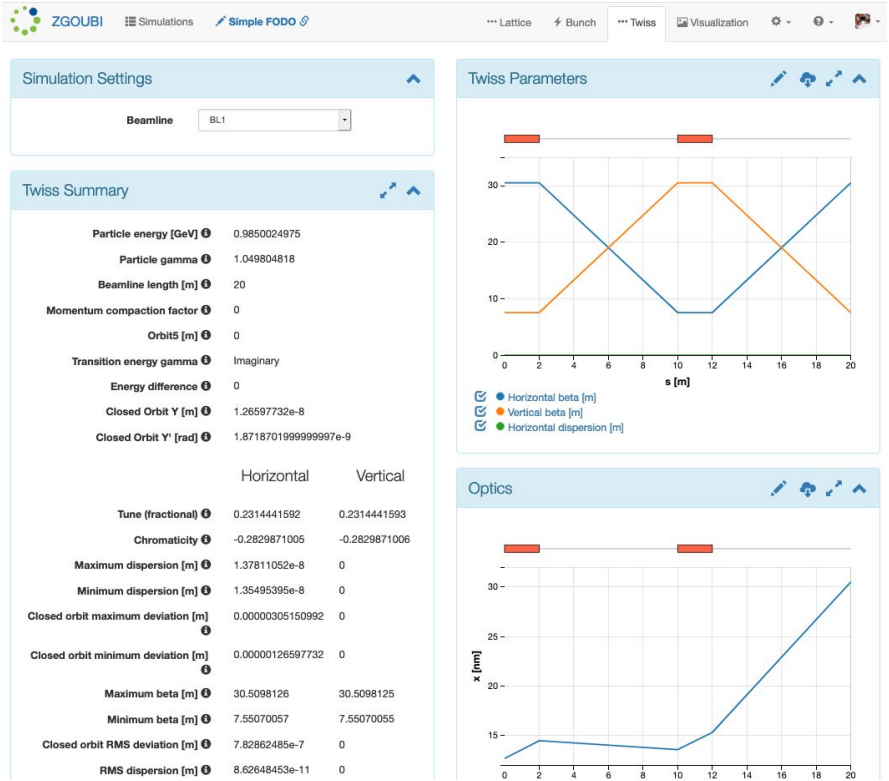
FODO example: Lattice

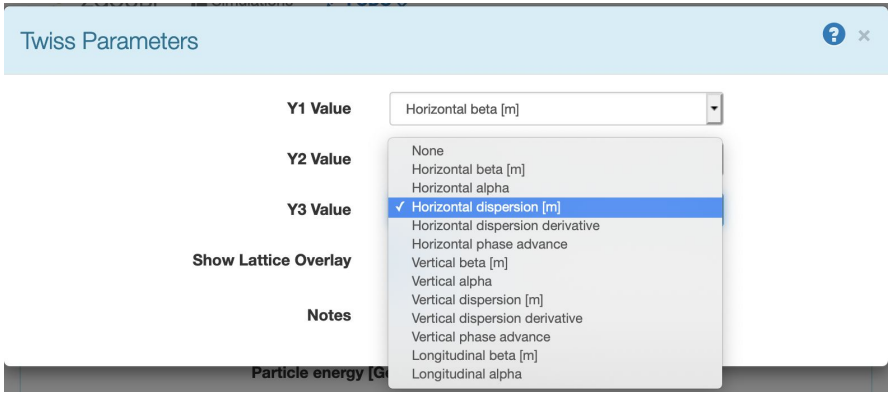


FODO example: Bunch

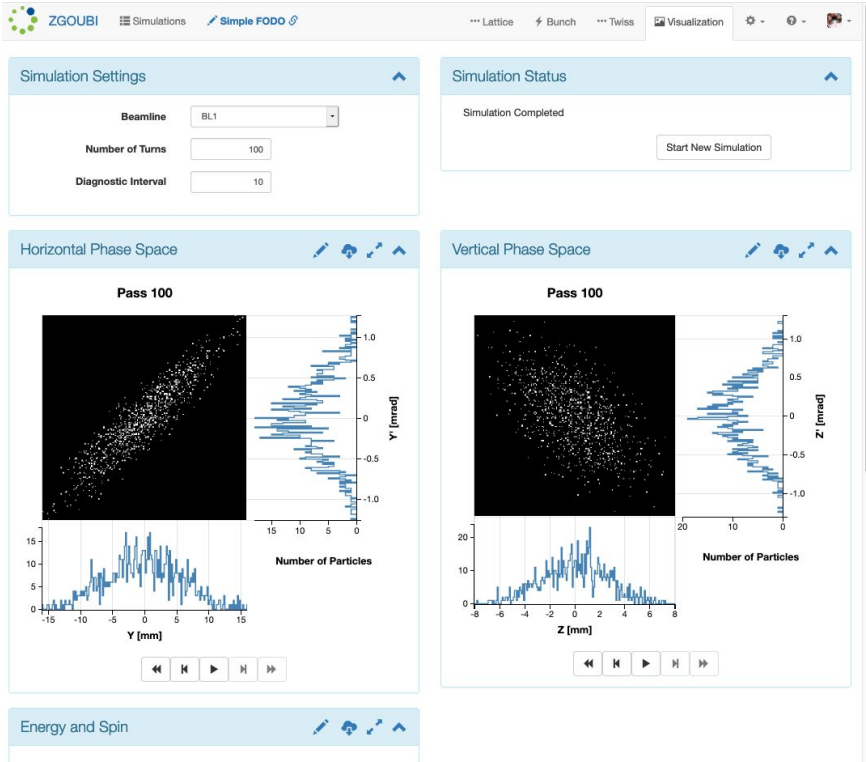


FODO Example: Twiss

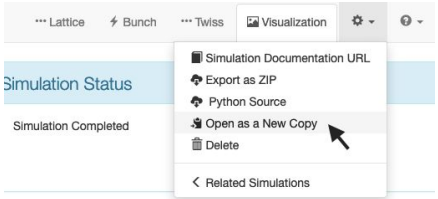


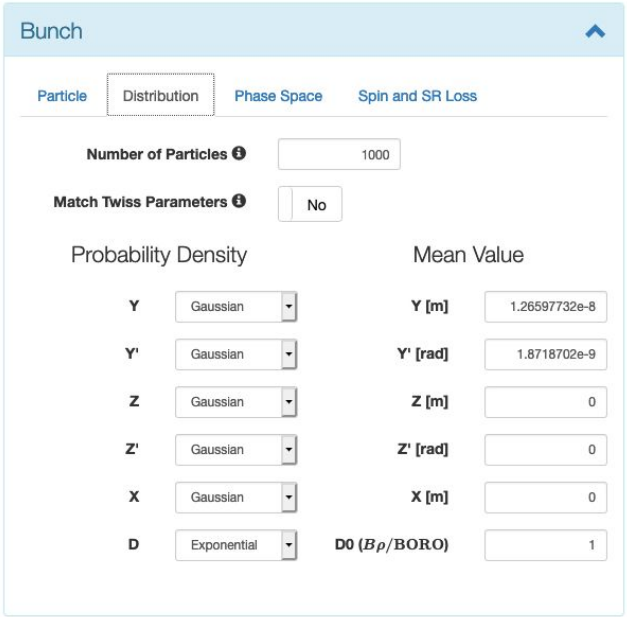


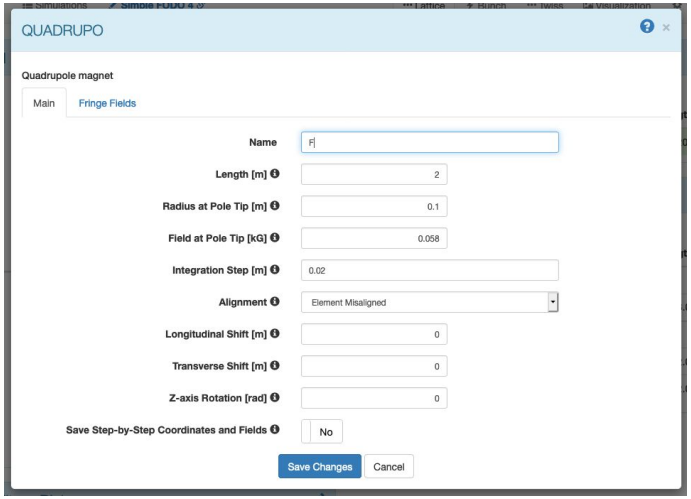
FODO Example: Visualization



Copy and Modify a Simulation

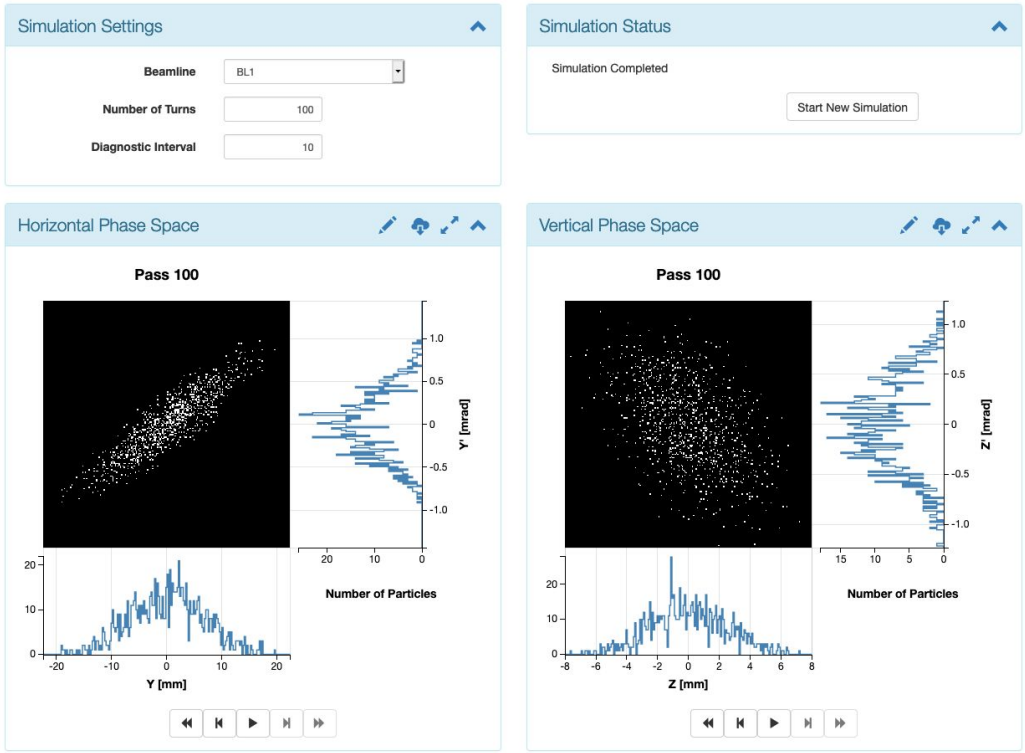






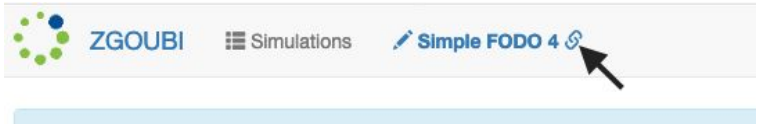
Turn off bunch/twiss matching and introduce an error to the F quad field, B_0: 0.058

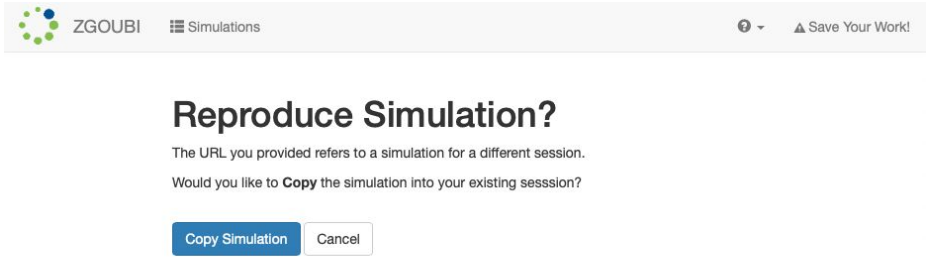
Copy and Modify a Simulation



Run the simulation and observe how the bunch's horizontal phase space is no longer uniform across turns.

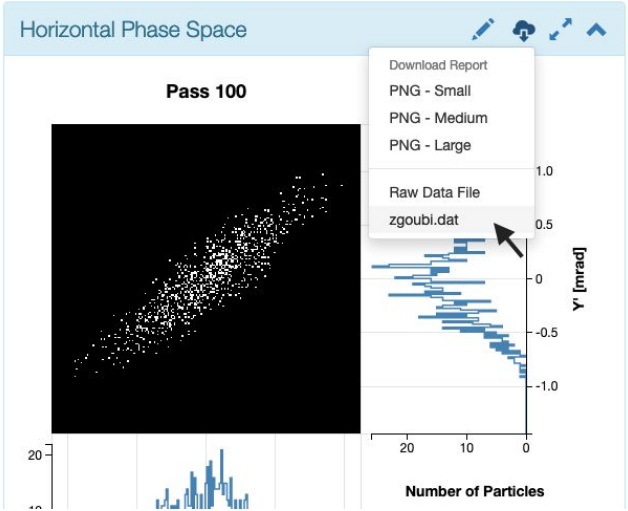
Sharing a Simulation



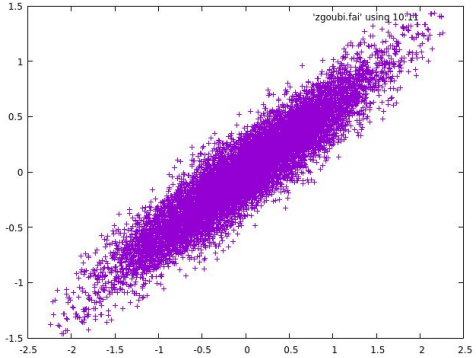


https://beta.sirepo.com/zgoubi#/lattice/z2KgcrJ4

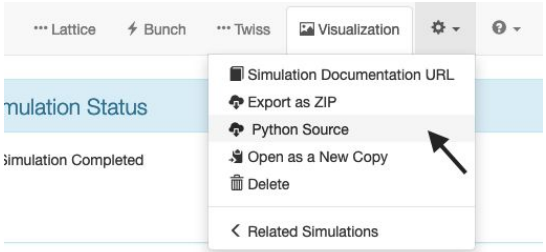
Export zgoubi.dat




```
[py2;@v3 zz]$ zgoubi

 Zgoubi, author's dvlpmnt version.
 Job  started  on  27-08-2019,  at  21:49:03
  Copying  zgoubi.dat  into  zgoubi.res,
  numbering  and  labeling  elements...

 Title :


   1/   10 OPTIONS   /                   /

 Zgoubi, author's dvlpmnt version.
 Job  started  on  27-08-2019,  at  21:49:03
 JOB  ENDED  ON    27-08-2019,  AT  21:49:10

  CPU time, total :     6.0401009999999999
[py2;@v3 zz]$ gnuplot

        G N U P L O T
        Version 5.0 patchlevel 6    last modified 2017-03-18

        Copyright (C) 1986-1993, 1998, 2004, 2007-2017
        Thomas Williams, Colin Kelley and many others

        gnuplot home:     http://www.gnuplot.info
        faq, bugs, etc:   type "help FAQ"
        immediate help:   type "help"  (plot window: hit 'h')

Terminal type set to 'qt'
gnuplot> plot 'zgoubi.fai' using 10:11
plot 'zgoubi.fai' using 10:11
```

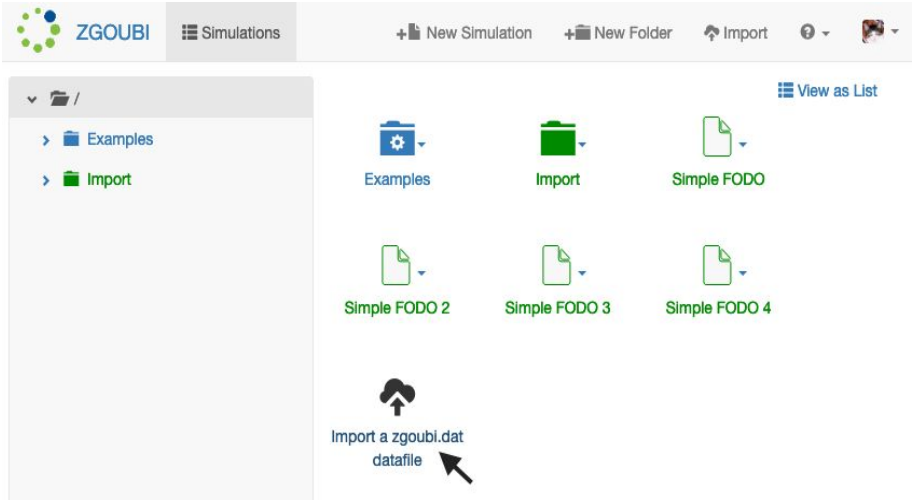


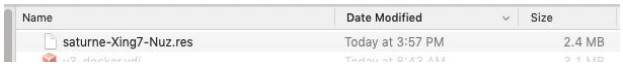
Export pyzgoubi

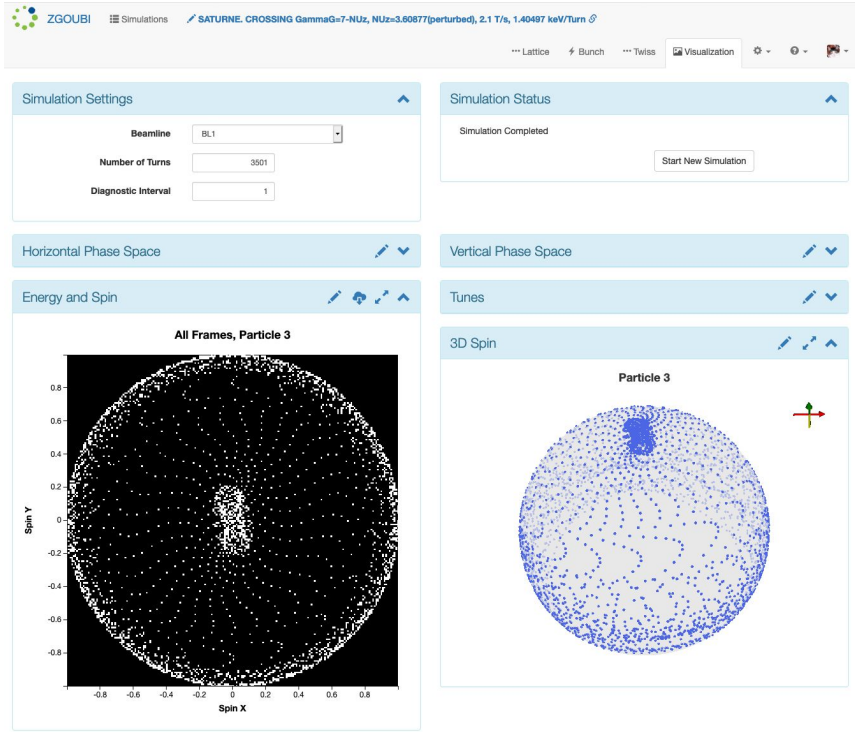



```python
# Simple FODO 4

from zgoubi import core, utils
import re

def sext(*args, **kwargs):
    return core.FAKE_ELEM(re.sub('QUADRUPO', 'SEXTUPOL', core.QUADRUPO(*args, **kwargs).output()))

core.SEXTUPOL = sext

line = core.Line('line')

line.add(core.FAKE_ELEM("""
'OPTIONS'
1 1
WRITE OFF
"""))
line.add(core.FAKE_ELEM("""
'MCOBJET'
1000
3
1000
2 2 2 2 2 2
1.26597732e-08 1.8718702e-09 0 0 0 1
-2.2014181 30.509813 1e-06 3 1.3593498e-08 -2.3450892e-11
0.66847085 7.5507006 1e-06 3 0 0
0 1 1e-06 3 0
123456 234567 345678
"""))
line.add(core.FAKE_ELEM("""
'PARTICUL'
PROTON
"""))


line.add(core.QUADRUPO("F", CS_5=0, X_E=0.0, CS_3=0, CS_2=0, CS_1=0, CS_0=0, R_0=10.0, CS_4=0,
    X_S=0.0, C_1=0, C_0=0, C_3=0, C_2=0, C_5=0, C_4=0, B_0=0.058, KPOS=2, XPAS=2.0, IL=0, ALE=0,
    YCE=0.0, XCE=0.0, LAM_E=0.0, XL=200.0, LAM_S=0.0))
line.add(core.DRIFT("O", XL=800.0))
line.add(core.QUADRUPO("D", CS_5=0, X_E=0.0, CS_3=0, CS_2=0, CS_1=0, CS_0=0, R_0=10.0, CS_4=0,
    X_S=0.0, C_1=0, C_0=0, C_3=0, C_2=0, C_5=0, C_4=0, B_0=-0.07142857142, KPOS=1, XPAS=2.0, IL=0,
    ALE=0, YCE=0.0, XCE=0.0, LAM_E=0.0, XL=200.0, LAM_S=0.0))
line.add(core.DRIFT("O", XL=800.0))
line.add(core.FAKE_ELEM("""
'FAISTORE'
zgoubi.fai
10
"""))
line.add(core.REBELOTE(K=99, NPASS=99))
line.add(core.END())

with open('zgoubi.dat', 'w') as f:
    f.write(line.output())

```

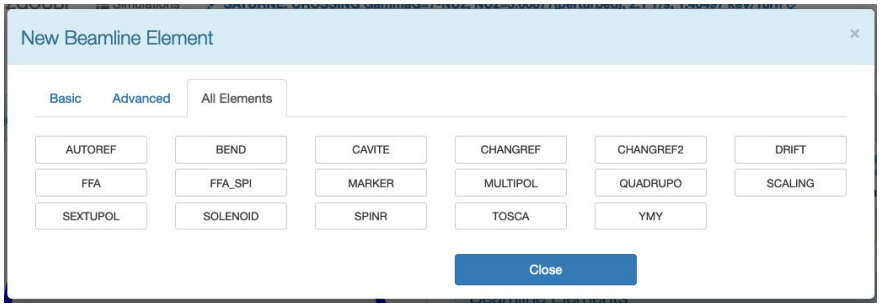
Import zgoubi.dat



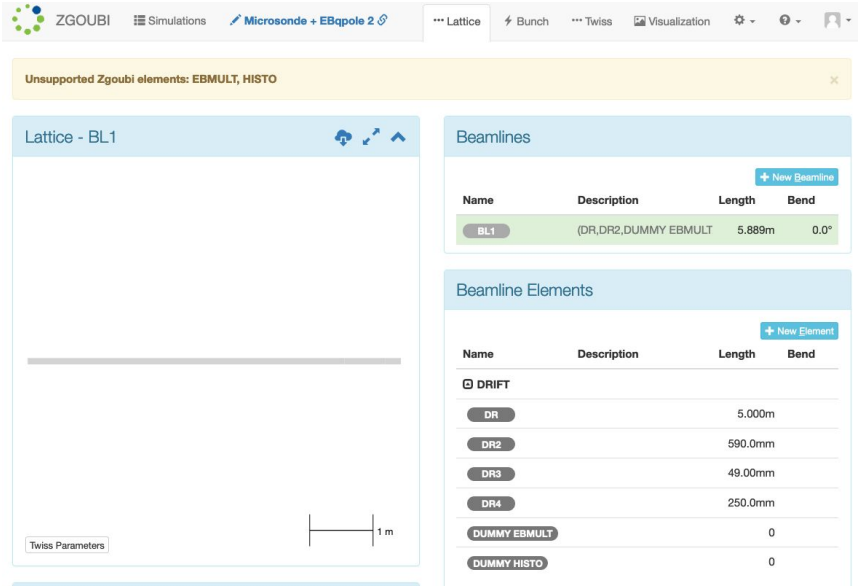




Import zgoubi.dat, unsupported elements



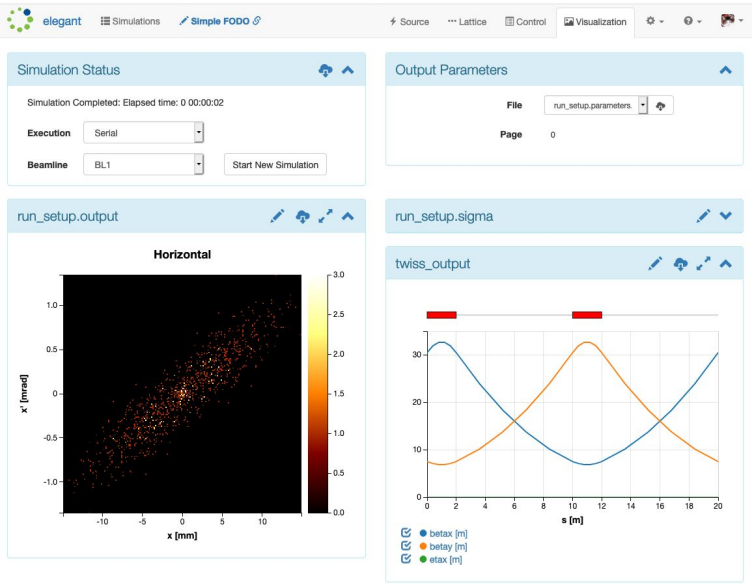
Let us know which element you need, email support@radiasoft.net

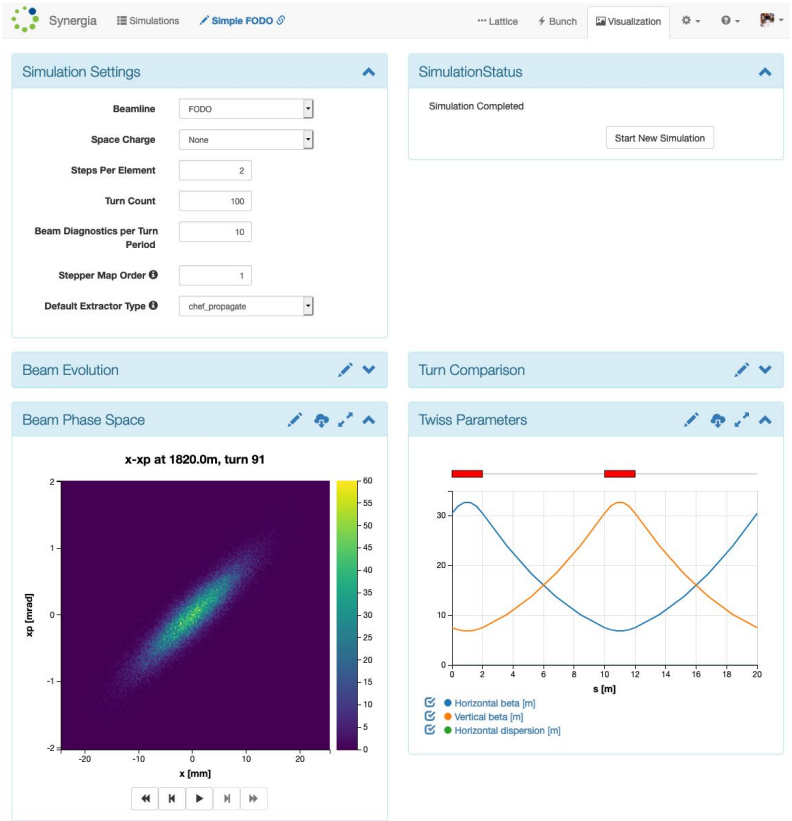


Compare with other codes (elegant and synergia)

https://beta.sirepo.com/elegant#/visualization/UFs5jg3k

https://beta.sirepo.com/synergia#/visualization/DSN6sJH7





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Let us know your comments and suggestions.

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