getsuper and New Plotting Library

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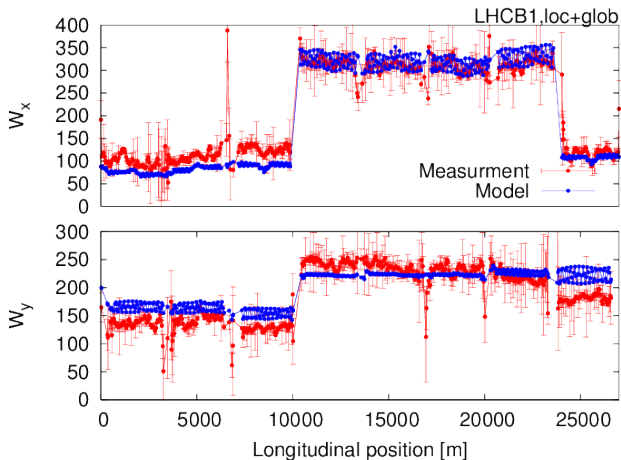
Chromatic Beta
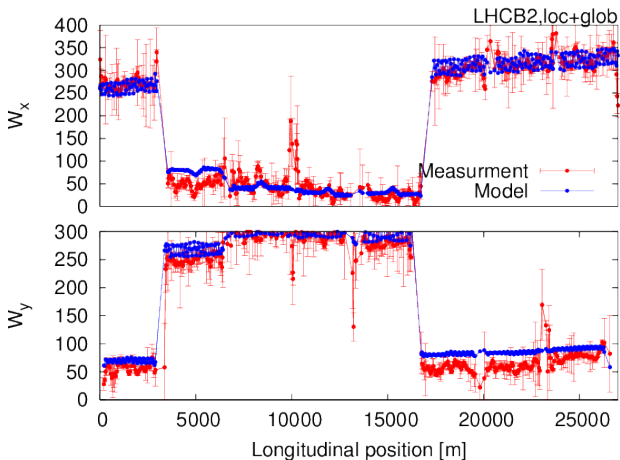
Reminder, from [1].

$$a = \frac{1}{\beta}\frac{\partial \beta}{\partial \delta_p} \tag{1}$$

$$b = \frac{\partial \alpha}{\partial \delta_p} - \frac{\alpha}{\beta}\frac{\partial \beta}{\partial \delta_p} \tag{2}$$

$$W = \sqrt{a^2 + b^2} \tag{3}$$

```
Usage: getsuper.py [options] sdds-file1 [sdds-file2
    ...]

Options:
  -m twiss twiss files to use
  -o <path> output path, where to store the results
  -b <path> where beta-beat is stored
  -t ALGORITHM  Which algorithm to use (SUSSIX/SVD)
  -a ACCEL, --accel=ACCEL Which accelerator: LHCB1
    LHCB2 SPS RHIC
  --qx=<value> Fractional horizontal tune
  --qdx=<value> AC dipole driven horizontal tune
  --llm_version=<version> Run with specific version
    of GetLLM.py
```

"import *" is a bad idea when writing for a project.
Example:

```
from numpy import *
...
from math import *
...
# how to know where this function is coming from?
cos(1.2)
```

In Python, % is nice for writing macros
Example:

```
pi=3.141592653589793
mystr="Pi is"
print "%(mystr)s %(pi).2f" % locals()
```

In Python, it's convenient to mark the main function. This way the main part is not executed when importing as a library... So more flexible in the long run.

Example:

```python
import mylib
def my_func(name):
  print "Hello",name,"!"
...
if __name__=="__main__":
  name="Rogelio"
  my_func(name)
```

In Python, do not mix the tab character and whitespaces for indendation in the same file. In principle, a tab character equals 8 spaces, but this is known to be very common source of silly errors.

Plotting Library

- Documentation:
  http://cern.ch/Beta-beating/doc/Py4MAD/plotting
- Using macros to plot the results in gnuplot, based on previous manual path editing.
- URL not available in the CCC (?), more inconvenient in the end?
- BetaBeat, Dispersion, and NormDispersion created so far.

Simple example:

```
from plotting import *
dir1='path_to_my_old_results'
dir2='path_to_my_new_results'
BetaBeat(dir1,dir2)
Dispersion(dir1,dir2)
```

More advanced example:

```
from plotting import *

old='../Previous/res_last'
dirs=['res1','res2','res3','res4']
titles=['Res. 1','Res. 2','Res. 3']
fnames=['r1','r2','r3','r4']

for i in xrange(len(dirs):
  BetaBeat(dirs[i],old,title1=titles[i],title2='Old
      Res.',filename=fnames[i])
  for d2,t2 in zip(dirs[i:],titles[i:],fnames[i:]):
    BetaBeat(dirs[i],d2,title1=titles[i],title2=t2,
        filename=[fnames[i],f2].join('_'))
```

📄 G. Vanbavinckhove, M. Aiba, R. Bartolini, R. Calaga,
M. Giovannozzi, E. Hamish Maclean, R. Miyamoto, F. Schmidt, and
R. Tomas.

First measurements of higher order optics parameters in the lhc.

Technical Report CERN-ATS-2011-160, CERN, Geneva, Sep 2011.