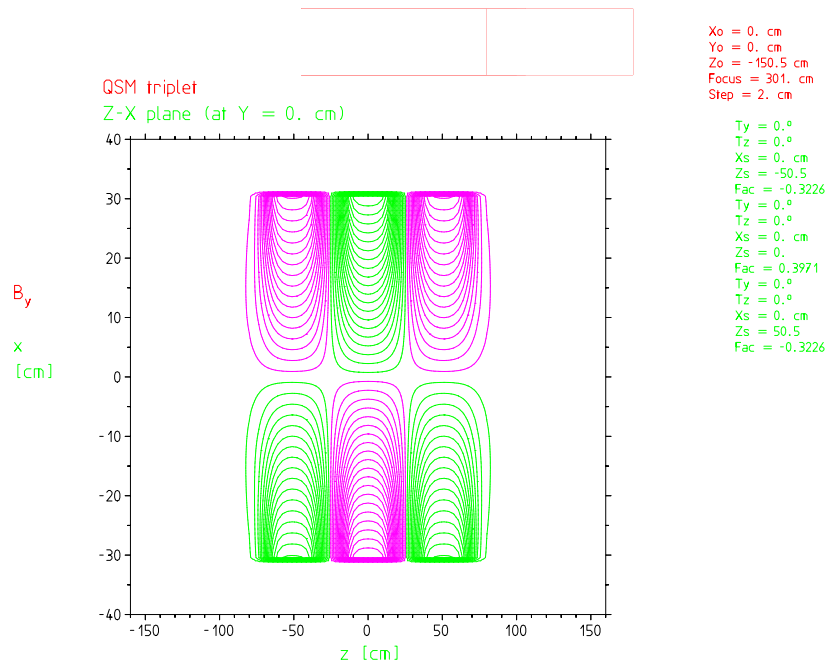


On the QSM triplet

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1 Introduction

I am giving here the comparison between **trans** and **trajg** programmes for a triplet of QSM quadrupoles. Bellow is the field distribution in the X-Z plane¹, as can be seen the distance between quadrupole are rather shorts !!

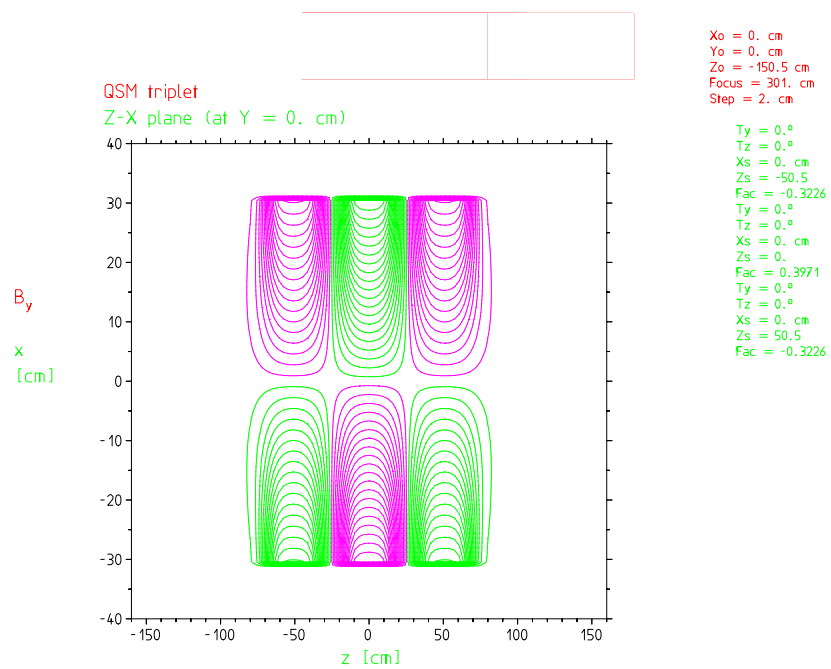


Figure 1:

¹TRANSPORT convention

2 TRANSPORT first order coefficients

Bellow is the result from **trans** programme for the triplet :

```

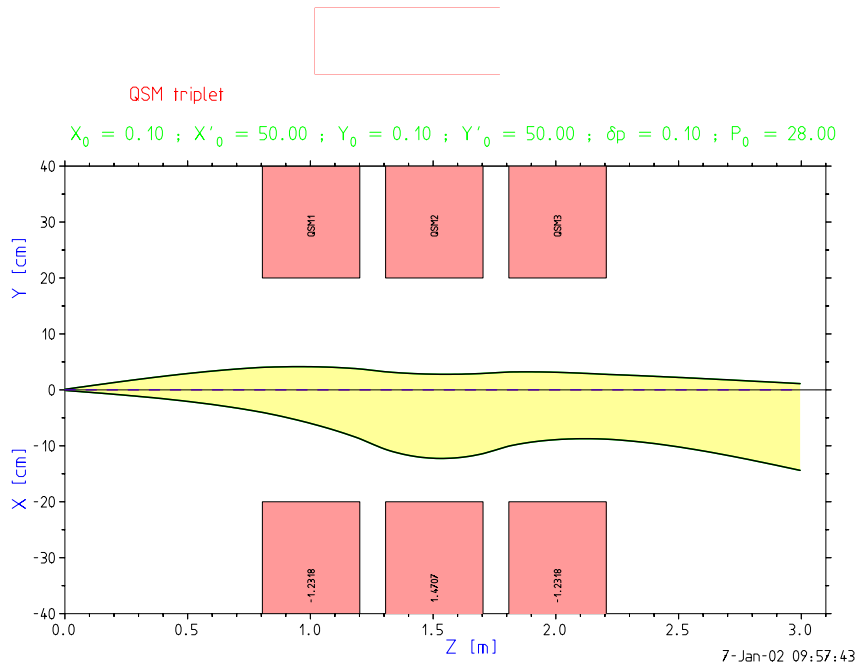
QSM triplet
40.  40.  3.0
0.1 20. .1 20. 0.1 28.
D 0.8045
F .1067 -.0140 0.0272 IN
Q  -1.2318      0.3970      0.2000  QSM1
F .1067 -.0140 0.0272 OUT
D 0.105
F .1067 -.0140 0.0272 IN
Q  +1.4707      0.3970      0.2000  QSM2
F .1067 -.0140 0.0272 OUT
D 0.105
F .1067 -.0140 0.0272 IN
Q  -1.2318      0.3970      0.2000  QSM3
F .1067 -.0140 0.0272 OUT
D 0.8045
ZONE

```

First order matrix

+1.4866	+0.2904	+0.0000	+0.0000	+0.0000
+4.1846	+1.4866	+0.0000	+0.0000	+0.0000
+0.0000	+0.0000	-0.9745	-0.0215	+0.0000
+0.0000	+0.0000	+2.0851	-0.9745	+0.0000
+0.0000	+0.0000	+0.0000	+0.0000	+1.0000

Det = 0.9892 Focus = 3.0100 m



3

Figure 2:

3 TRAJG first order coefficients

Here the corresponding triplet.set file and coefficients :

```

MAPINPUT
qsm01a

ADJUST
  1   -0.322600   0.0000   0.0000  -50.5000   0.0000   0.0000
  1    0.397100   0.0000   0.0000   0.0000   0.0000   0.0000
  1   -0.322600   0.0000   0.0000   50.5000   0.0000   0.0000

KINE
 28.000  0.000  0.000 -150.500  0.000  2.000  0.000 105.658

FOCUS
 301.0000

CAPTION
  QSM triplet

ZONE

Po = 28.0000 MeV/c  dP = 0.0000 MeV/c

n      Fac      Xs [cm]  Ys [cm]  Zs [cm]  Ty []  Tz []
1      -0.3226   0.0000   0.0000  -50.5000  0.0000  0.0000
2       0.3971   0.0000   0.0000   0.0000   0.0000  0.0000
3      -0.3226   0.0000   0.0000   50.5000  0.0000  0.0000

xm      ym      xpm      ypm      dpm [MeV/c]
0.5000  0.5000  10.0000  10.0000  1.0000

Xo = 0.00 cm  Yo = 0.00 cm  Zo = -150.50

Foc = 301.0000 cm  Step = 2.00 cm  Eps = 0.1000E-02

Determinant = 0.1004E+01

      QUADRATIC Interpolation

      *TRANSFORM* 1

1.12097  0.24975  0.00000  0.00000  0.00000
1.03048  1.12535  0.00000  0.00000  0.00000
0.00000  0.00000 -0.99702 -0.01046  0.00000
0.00000  0.00000  0.56165 -0.99708  0.00000
0.00000  0.00000  0.00000  0.00000  1.00000

```

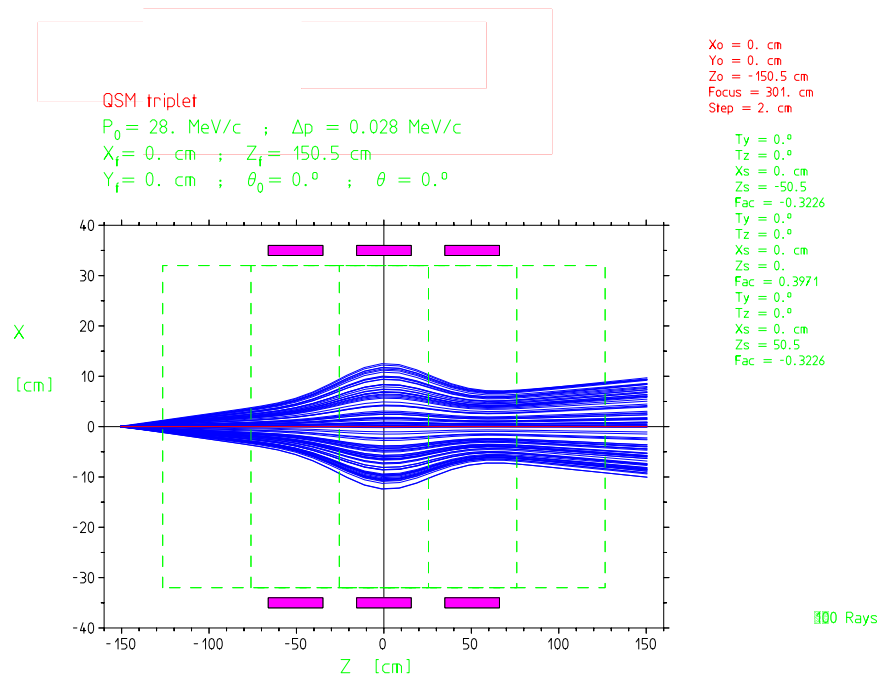


Figure 3:

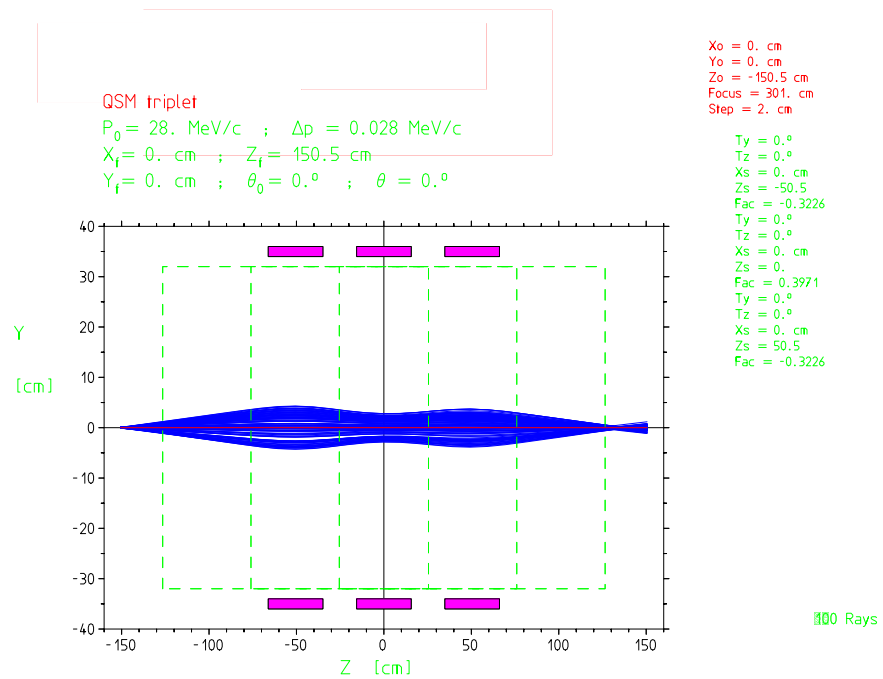


Figure 4:

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