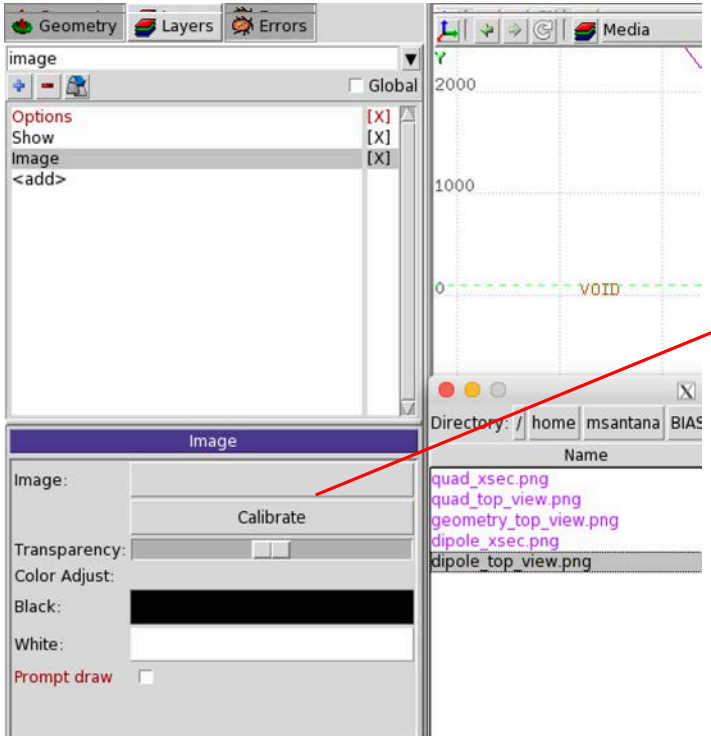
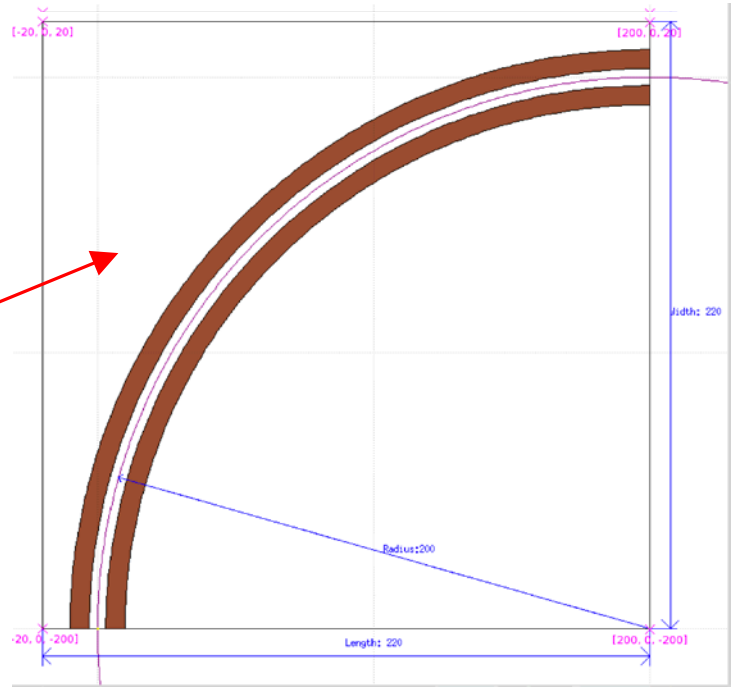
Exercise – Geometry – Solution(s)

Advanced FLUKA Course

a)

- Load basic.inp
  - Flair: Input>New
  - Or copy from .../flair-X-YY/templates/basic.inp
- Eliminate TARGET from basic.inp
  - Flair/geoviewer – click and delete, then right click on TARGET in region list --> delete
- Flair(geoviewer) overlay method: create layer / add image / calibrate





a)

- Add Bodies over the drawing. Fine tune through ‘properties’
- Use cross section view to build the iron region by Adding Zones (first select all bodies related to the zone), then click on sub-region domain

```
*    . yoke
RPP dipyoke      -200.0    20.0 -10.0 10.0 -200.0 20.0
YCC dipyokeo    -200.0 -200.0 210.0
YCC dipyokei     -200.0 -200.0 190.0
*    . pipe
XZP dip_bpu      1.5
XZP dip_bpd     -1.5
YCC dip_bpo     -200.0 -200.0 203.0
YCC dip_bpi      -200.0 -200.0 197.0
*-----
*    . yoke
DIP_YOKE     5 | +dipyoke  +dipyokeo  -dipyokei   -dip_bpu
               | +dipyoke  +dip_bpu    -dip_bpd   +dipyokeo  -dip_bpo
               | +dipyoke  +dip_bpu    -dip_bpd   +dip_bpi    -dipyokei
               | +dipyoke  +dipyokeo   -dipyokei  +dip_bpd
*    . pipe
DIP_BPVC     5   +dipyoke  +dip_bpu    -dip_bpd   +dip_bpo   -dip_bpi
*    . out
DIP_OUT_     5 | +dipyoke  -dipyokeo
               | +dipyoke  +dipyokei
```

b)

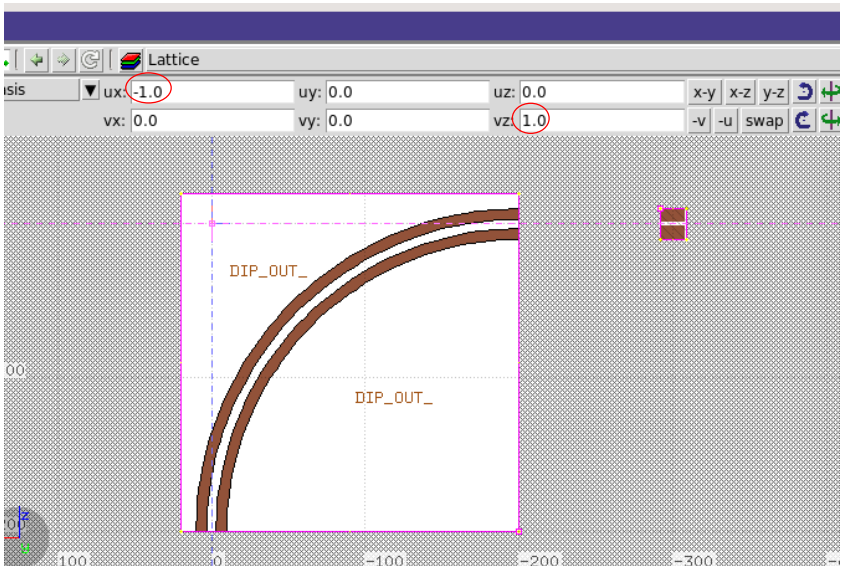
- ‘parking gallery’ with prototypes

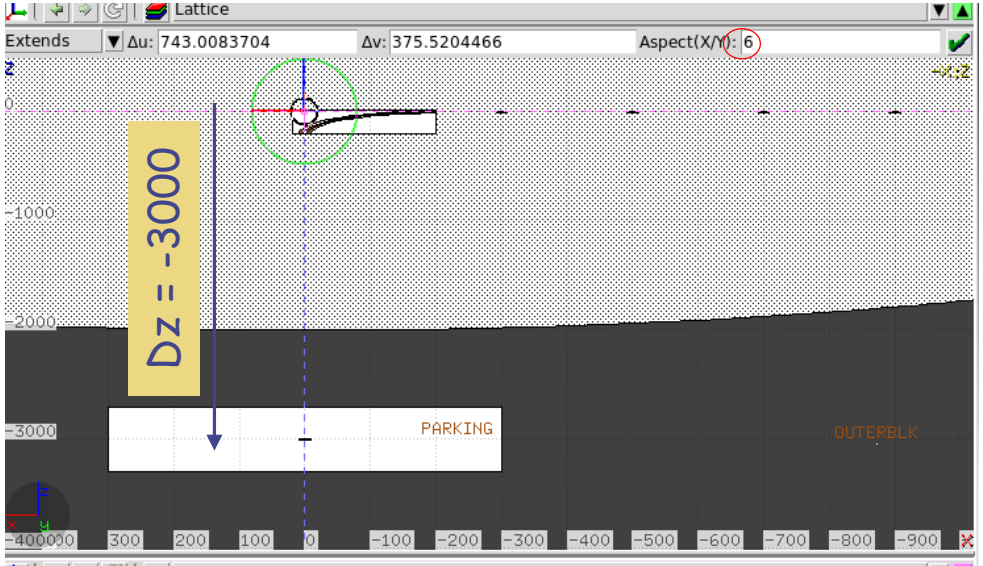
```
* parking
RPP parking    -300.0 300.0 -300.0 300.0 -3300.0 -2700.0
...
OUTERBLK     5 +outer    -inner      –parking
PARKING      5 +parking -quadyoke
```

- Simple quadrupole prototype – comment translation to see effects

```
$start_translat 0.0 0.0 -3000.0
*    . yoke
RPP quadyoke   -10.0 10.0 -10.0 10.0 -8.5 8.5
*    . pipe
ZEC quad_bp    0.0 0.0 3.0 1.5
$end_translat
```

Infinite elliptical cylinder along **z** axis with Rx=3, Ry=1.5





c)

- Bounding boxes x4 – only difference is transformation and body name

```
$start_transform -QUAD___1
$start_translat 0.0 0.0 -3000.0
RPP quad___1   -10.0 10.0 -10.0 10.0 -8.5 8.5
$end_translat
$end_transform

[...]

$start_transform -QUAD___4
$start_translat 0.0 0.0 -3000.0
RPP quad___4   -10.0 10.0 -10.0 10.0 -8.5 8.5
$end_translat
$end_transform

[...]

* outer vacuum:
OUTERVAC     5 +inner -dipyoke  -quad___1 -quad___2 -quad___3 -quad___4

[...]

QUAD___1     5 +quad___1
QUAD___2     5 +quad___2
QUAD___3     5 +quad___3
QUAD___4     5 +quad___4
```

c)

- LATTICE DECLARATIONS

```
*---+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
LATTICE     QUAD___1                QUAD___1                QUAD___1
LATTICE     QUAD___2                QUAD___2                QUAD___2
LATTICE     QUAD___3                QUAD___3                QUAD___3
LATTICE     QUAD___4                QUAD___4                QUAD___4
```

Replica region names (could be different from other names, e.g. QUAD_1R,… but must match what is set in the geometry

Lattice names (e.g. for user routines), can use different name, e.g. QUAD__1L

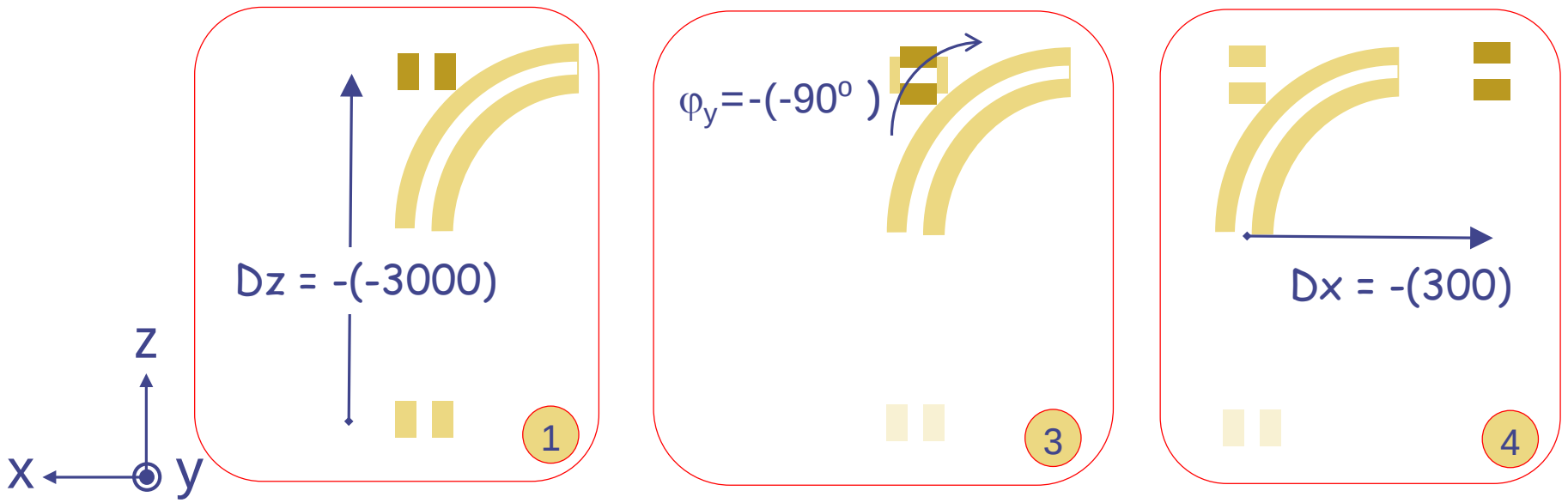
Roto-translation names: Each one can be the catenation of several ROT-DEFI cards

c)

- ROTOTRANSLATIONS

```
*---+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----
* Transformation for quad 1:
ROT-DEFI        200.       0.0     -90.0     300.0       0.0       0.0QUAD___1
#if DFFD
ROT-DEFI         0.0       0.0      90.0       0.0       0.0       0.0QUAD___1
#endif
ROT-DEFI         0.0       0.0       0.0       0.0       0.0   -3000.0QUAD___1
```

3 4 2 1



c)

- ROTOTRANSLATIONS

```
*---+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----
* Transformation for quad 1:
ROT-DEFI        200.       0.0     -90.0     300.0       0.0       0.0QUAD___1
#if DFFD
ROT-DEFI         0.0       0.0      90.0       0.0       0.0       0.0QUAD___1
#endif
ROT-DEFI         0.0       0.0       0.0       0.0       0.0   -3000.0QUAD___1
* Transformation for quad 2:
ROT-DEFI        200.       0.0     -90.0     500.0       0.0       0.0QUAD___2
#if FDDF
ROT-DEFI         0.0       0.0      90.0       0.0       0.0       0.0QUAD___2
#endif
ROT-DEFI         0.0       0.0       0.0       0.0       0.0   -3000.0QUAD___2
* Transformation for quad 3:
ROT-DEFI        200.       0.0     -90.0     700.0       0.0       0.0QUAD___3
#if FDDF
ROT-DEFI         0.0       0.0      90.0       0.0       0.0       0.0QUAD___3
#endif
ROT-DEFI         0.0       0.0       0.0       0.0       0.0   -3000.0QUAD___3
* Transformation for quad 4:
ROT-DEFI        200.       0.0     -90.0     900.0       0.0       0.0QUAD___4
#if DFFD
ROT-DEFI         0.0       0.0      90.0       0.0       0.0       0.0QUAD___4
#endif
ROT-DEFI         0.0       0.0       0.0       0.0       0.0   -3000.0QUAD___4
```