Multipole Field Map

Mnemonic	Parameter	Definition
MULTIPOLE	*Order*	Multipole order
	L	Field map length (mm)
	Nstep	Number of step along x & y direction
	B or E	Magnetic field on pole (T) or E (MV/m)
	R	Aperture (mm)
	Lsol	Physical length (mm) of solenoid (*Order=0*)
	Zstep	Number of step for solenoid case (*Order=0*)
	Elec	0: Magnetic field map, 1:Electrique field map

Attention to the TraceWin gradient definition.

The mutipole element generates a **2D (*x*, *y*) static magnetic field map file** whose steps sizes are: d*x* = d*y* = 2.*R*/*Nstep*. The step along z direction is defined by TraceWin calculation step. The simulation is made in this field map. Be aware that 2.*R*/*Nstep* must be much lower than the beam size.

Order parameter sets the order of the multipole field:

- *Order* = 0: (Special mode) for solenoid field map (Br(r,z) & Bz(r,z)),
- *Order* = 1: for dipole,
- *Order* = 2: for quadrupole,
- *Order* = 3: for sextupole,
- *Order* = 4: for octupole,
- …

L is the field map length along z direction.

Nstep defines the number of steps in the generated field map.

B is the magnet

Note about the FIELD_MAP equivalence

This element will create a FIELD_MAP type field map which can be reused directly in this type of element and which therefore allows, for example, the use of field map superposition feature, SUPERPOSE_MAP, which is not possible directly with the MULTIPOLE element. In the example below, the MULTIPOLE element will create the field map files "multipole2_1.bsx" & "multipole2_1.bsy". So in a second step, MULTIPOLE can be replaced by its equivalent in FIELD_MAP.

```
DRIFT 100.0 1000
MULTIPOLE 1 400 100 0.01 100  ; dipole
DRIFT 100.0 1000
```

Once simulation don, this can be replaced by:

```
DRIFT 100.0 1000
FIELD_MAP 0060 400 0 100 1e-2 1 0 0 multipole2_1
DRIFT 100.0 1000
```