

Magnetic Field Map in MarlinTPC

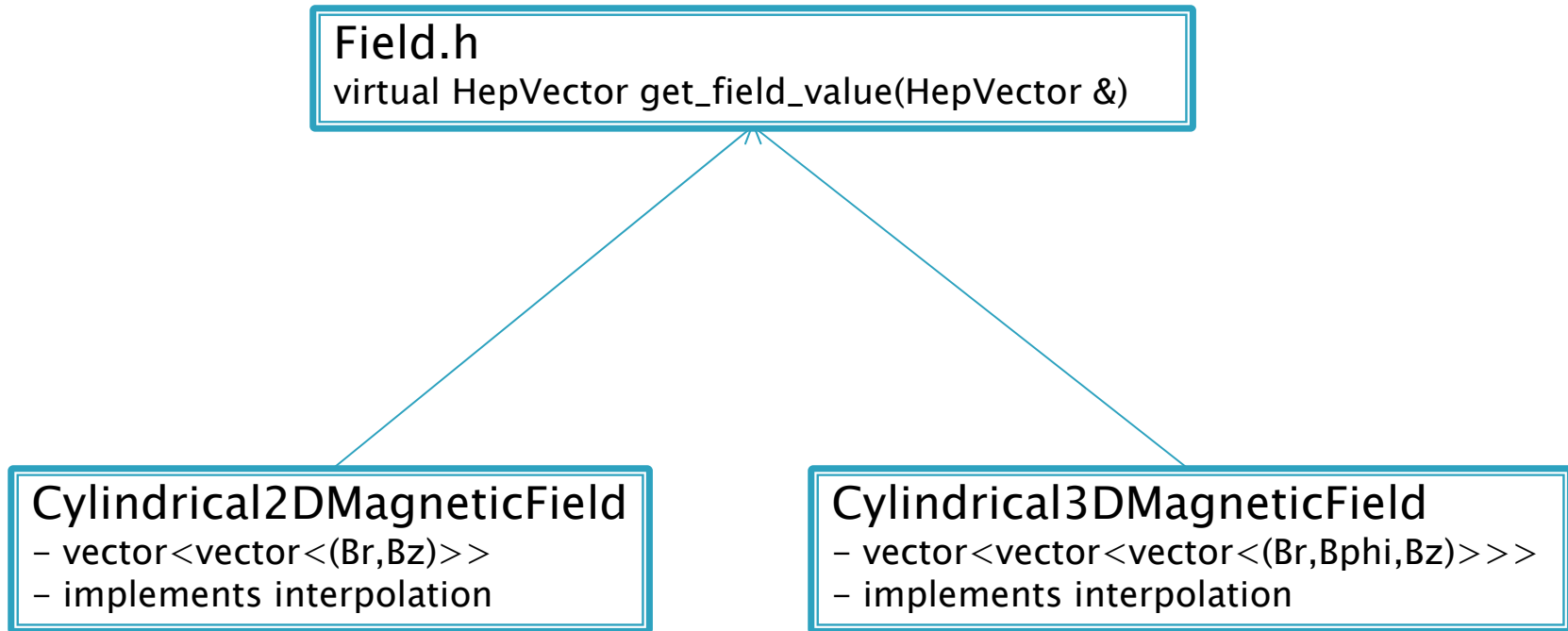
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Magnetic Field Map

- ▶ Measured Data
 - Correct for global position and orientation
 - Correct for 24 hall probe positions and orientations
 - Correct for offset in measured field for each probe
- ▶ Parametrized Coil Model
 - Current, length, radius, space between wire layers
 - Number of wires and distribution given
- ▶ Fourier–Bessel–Expansion of Maxwells Eq.
 - 2D–Series of Bessel functions
 - For $N, M \rightarrow \infty$, can describe any field
- ▶ Data – CoilModel – FB-Model = 0 10 Gauss
- ▶ Map in coil coordinate system!

MarlinTPC interface

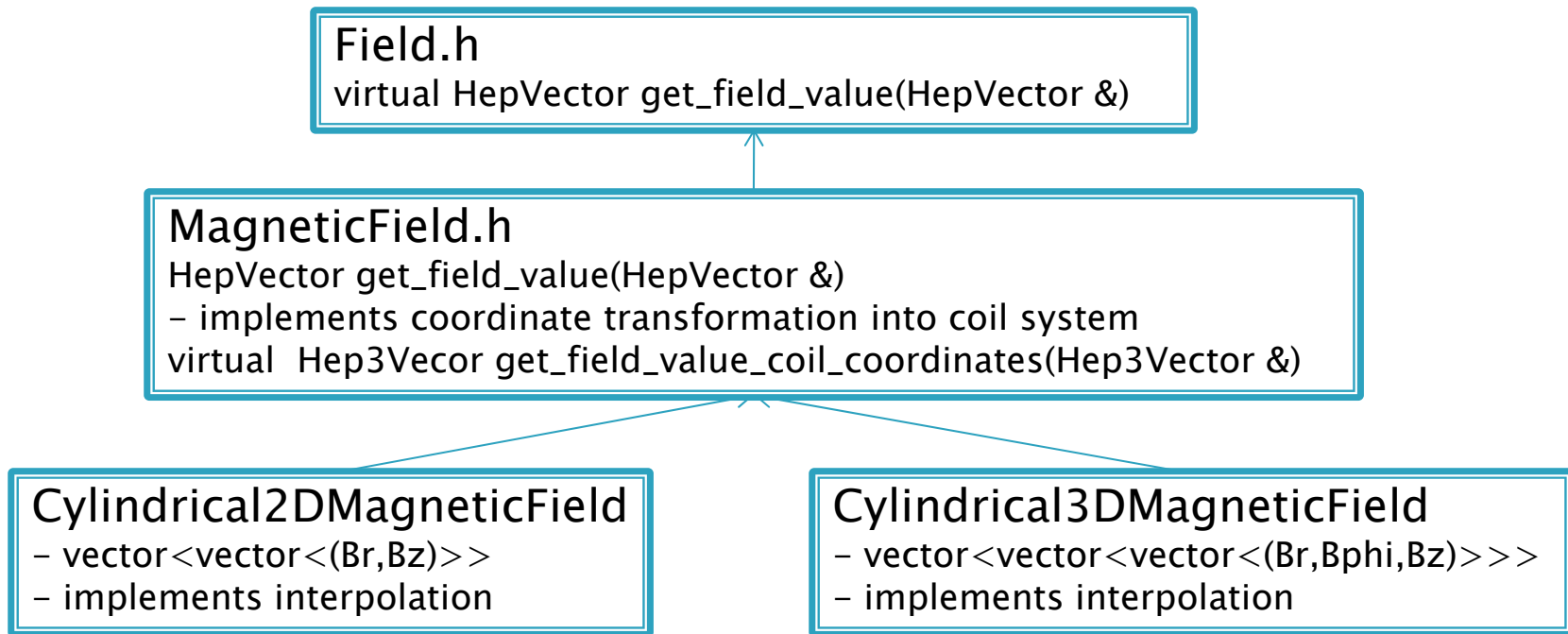
- ▶ Use existing interface /tools/Field/Field.h



- ▶ Takes LCCollection and stores field map into vector

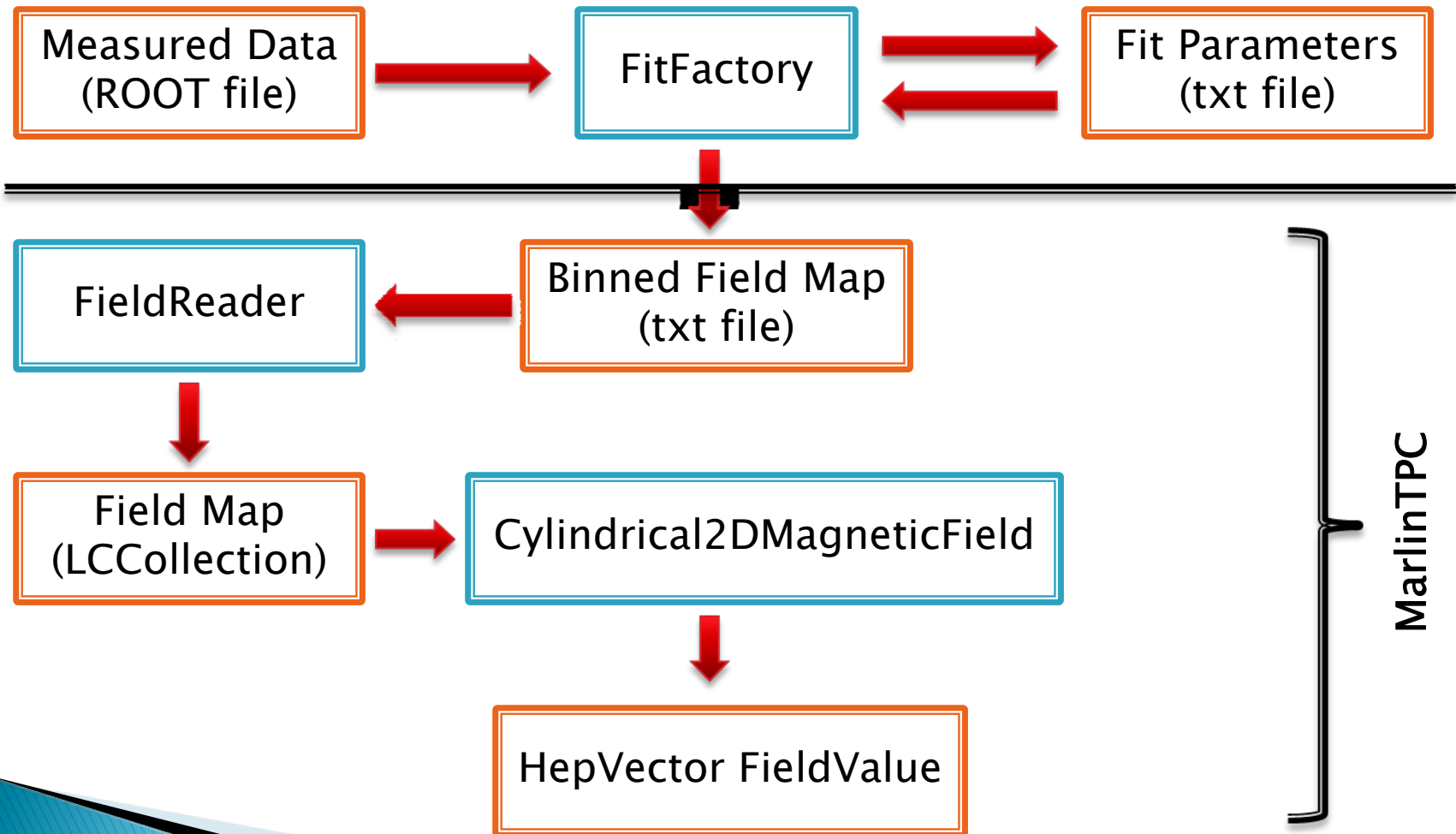
MarlinTPC interface

- ▶ Add layer to handle coordinate transformation



- ▶ This takes relative position and orientation of the TPC
- ▶ Why HepVector and not Hep3Vector?

Data Flow



Content of field map text file?

- ▶ Name
- ▶ Description
- ▶ Type, i.e. Cylindrical2DMagneticField
- ▶ r_{\min} , r_{\max} , z_{\min} , z_{\max}
- ▶ bins_r , bins_z

- ▶ Actual field map
 - r , z , B_r , B_z **or** B_r , B_z
 - r and z are given by global parameters and entry number

Status

- ▶ MarlinTPC interface
 - MagneticField, Cylindrical2DMagneticField, Cylindrical3DMagneticField – done, needs testing
 - FieldReader – needs more work, need to define structure of input text file
- ▶ FitFactory – working
 - Adapt output to FieldReader input
 - Quite messy, not maintainable in this status
 - Needs some major rewriting (remove dependencies from private vector and rotation classes)
 - Could move into MarlinTPC afterwards