Calculation of global distortions and corrections

Documentation

O2TPCSpaceCharge3DCalc.h

- The goal of this class is to calculate the global corrections and global distortions on a defined regular grid. The number of vertices in r, z, phi and the datatype float/double used for the calculations are template parameters. The global corrections and distortions can be calculated by an analytical approach using a TFormula (appropriate formulas will be defined in the class) or by using a TH3X as an input for the space charge density. The following steps have to be performed for the calculation of the global distortions/ corrections:
- 0. Set Boundary conditions: *fillBoundaryAndChargeDensities()*;
- 1. Solve Poisson equation: $\Delta\Phi(r,\phi,z) = \rho(r,\phi,z)$ *poissonSolver()*
- 2. Electric field: $\vec{E} = -\nabla\Phi(r,\phi,z)$ *calcEField();*
- 3. Calculate local distortions and corrections using Langevin equation: *calcLocalDistortionsCorrections()*
- *4.* Integrate local distortions/corrections to obtain global distortions/corrections *calcGlobalDistortionsCorrections();*

overview

O2TPCSpaceCharge3DCalc.h

template <typename DataT = float, unsigned int Nr = 4, unsigned int Nz = 4, unsigned int Nphi = 4>

mGrid3D

RegularGrid3D.h

template <typename DataT = float, unsigned int Nr = 4, unsigned int Nz = 4, unsigned int Nphi = 4>

Container for local/global distortions/corrections
Electric field etc.

pointer/reference?
to RegularGrid3D.h

TriCubic.h

Matrix.h

Vector and matrix multiplication

Storage format in single array (only single scalar values for now):
Small grid: DataT mGridData[] (stack)
Large grid: std::unique_ptr<DataT[]> mGridData (heap)