


Global Alignment Constants Proposal

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25 January, 2008

Global alignment constants

I would like to propose an implementation of global alignment constants and volunteer to incorporate them in CMSSW before 2_0_0. (This proposal is a combination of suggestions from Andrei, Frederic, Rainer, and myself.)

Global alignment constants define a coordinate system for each major detector in CMS: tracker, ECAL, HCAL, muon barrel, and each of the two muon endcaps, so that internally-aligned detectors can all be aligned to a single global coordinate system.

- I would introduce one new record, GlobalPositionRcd, in CondFormats/AlignmentRecord which would store an AlignTransform (6 numbers describing a translation and a rotation). This record will contain an entry for each of the major detectors.

- I would add a new templated method in GeometryAligner, "applyGlobalPosition", which shifts and rotates all detector elements around the origin.

- Every geometry producer, after calling GeometryAligner::applyAlignments, must then call GeometryAligner::applyGlobalPosition to correct the global coordinate system. I can propagate these changes to the following modules, assuming I have access, or provide instructions to those who do.

  `Alignment/CommonAlignmentProducer/plugins/AlignmentProducer.cc`
  `Alignment/LaserAlignment/plugins/LaserAlignment.cc`
  `Alignment/MuonAlignment/plugins/MisalignedMuonESProducer.cc`
  `Alignment/TrackerAlignment/plugins/MisalignedTrackerESProducer.cc`
  `Alignment/OfflineValidation/src/TrackerGeometryCompare.cc`
  `Alignment/OfflineValidation/src/MuonGeometryIntoNtuples.cc`
  `Geometry/CSCGeometryBuilder/plugins/CSCGeometryESModule.cc`
  `Geometry/DTGeometryBuilder/plugins/DTGeometryESModule.cc`
  `Geometry/TrackerGeometryBuilder/plugins/TrackerDigiGeometryESModule.cc`

- Corresponding implementation for ECAL and HCAL would need to be done by someone with more expertise. If there isn't time to do this by the end of February, we can leave the ECAL and HCAL entries in GlobalPositionRcd as place-holders for the future.