

DEVELOPMENT CATIA_2_GEANT INTERFACE FOR SIMULATION OF HIGH ENERGY PHYSICS EXPERIMENTS

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High Energy Physics (HEP) implements simulation for deep and wide range investigation of physics experiments by generating artificial events from the Monte-Carlo (MC) events generators in a format which is identical to the output of the facilities for experiment, detectors. However in some regions of detector data_vs_MC never match perfectly and there are discrepancies. Several reasons can cause it but in most of the cases correct representation of detector geometry plays key role. Simulation infrastructure implements GEANT for geometry modelling. Shapes consistency and detalization is not important while adequateness of volumes and weight of detector components are essential for tracking. Geometry descriptions stored in database in general formats – XML, Oracle tables, etc. Then it is transforming in GEANT during the simulation.

Thus, geometry inaccurateness in GEANT can caused by inconsistency of GEANT geometry with “as-built” geometry and inaccurateness of transformations added by simulation infrastructure itself. For investigation of both reasons CATIA-GEANT interface was built. The aim was to use CATIA as a hub for collecting of different geometry descriptions using by simulation and in same time make their comparison to find faults and analyse quality of GEANT simulation infrastructure.

Paper represent results of analysis done for the ATLAS experiment at LHC – Large Hadron Collider, CERN, Geneva, Switzerland.