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A Tool to Convert CAD Models for Importation into Geant4

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The engineering design of a particle detector is usually performed in a Computer Aided Design (CAD) program, and simulation of the detector's performance can be done with a Geant4-based program. However, transferring the detector design from the CAD program to Geant4 can be laborious and error-prone.

SW2GDML is a tool that reads a design in the popular SolidWorks CAD program and outputs Geometry Description Markup Language (GDML), used by Geant4 for importing and exporting detector geometries. SW2GDML utilizes the SolidWorks Application Programming Interface for direct access to the design and then converts the geometric shapes described in SolidWorks into standard GDML solids.

Other methods for outputting CAD designs are available, such as the STEP and STL formats, and tools exist to convert these formats into GDML. However, these conversion methods produce very large and unwieldy designs composed of tessellated solids that can reduce Geant4 performance. In contrast, SW2GDML produces compact, human-readable GDML that employs standard geometric shapes rather than tessellated solids.

This talk will describe the development and current capabilities of SW2GDML and plans for its enhancement. The aim of this tool is to automate importation of detector engineering models into Geant4-based simulation programs to support rapid, iterative cycles of detector design, simulation, and optimization.

Tertiary Keyword (Optional)

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