Title:

mesh2gdml: Importing CAD geometries into Geant4

Abstract:

Geant4 is the de facto HEP standard for simulating the interaction of particles with materials and fields. The software toolkit provides a very rich library of basic geometrical shapes, often referred to as “primitives”, plus the ability to define compound geometries, making it capable of supporting extremely complex physical structures. Current versions of Geant4 fully and natively support an xml-based Geometry Description Markup Language (GDML) to define geometries. The ability to directly import CAD geometries into Geant4 is an often requested feature, despite the recognized limitations of the difficulty in accessing proprietary formats, the mismatch between level of detail in producing a part and simulating it, the often disparate approaches to parent-child relationships and the difficulty in maintaining or assigning material definitions to parts. The main impediment to the importation of CAD files into Geant4 has been their proprietary formats. Thanks to the proliferation of rapid prototyping and additive manufacturing processes, the surface tesselation language (STL) format is the industrial standard for handling triangulated meshes and is ubiquitous as an export format for both CAD and other 3D modelling software. In this talk, we present mesh2gdml, a solution which converts an STL file into a GDML file which can be imported directly into Geant4. We believe the approach outlined in this talk provides access to a wider range of geometry inputs and will prove to be useful to a number of user communities.

Summary:

We present a pathway for importing CAD geometries into Geant4.