

Pyg4ometry : a python package to manipulate Monte Carlo geometry

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Creating, manipulating, editing and validating detector or accelerator geometry for Monte Carlo codes such as Geant4, FLUKA, MCNP and PHITS is a time consuming and error prone process. Diverse tools for achieving typical work flows are available but rarely under a single coherent package. Pyg4ometry is a python based code to manipulate geometry, mainly for Geant4 but also FLUKA and soon MCNP and PHITS. Pyg4ometry allows the conversion of geometry between different codes and CAD files. Pyg4ometry can act as a validator, to check for common issues in geometry that prevents MC code operation, e.g. overlaps. Pyg4ometry uses python as an effective parametric scripting language for the creation or editing of geometry. Pyg4ometry is also an effective compositor allowing the creation of detectors where the geometry comes from a diversity of sources. Pyg4ometry heavily uses the Computational Algorithms Library (CGAL), Visualisation Toolkit (VTK) and OpenCascade Technology (OCT) all accessed in python via pybind11. Pyg4ometry originated in accelerator background simulation where there is limited person-power for geometry creation and rapid prototyping is important.

Author: Prof. BOOGERT, Stewart Takashi (Royal Holloway, University of London)

Co-authors: NEVAY, Laurie (CERN); PERTOLDI, Luigi (TU München); SHIELDS, William

Presenter: Prof. BOOGERT, Stewart Takashi (Royal Holloway, University of London)

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