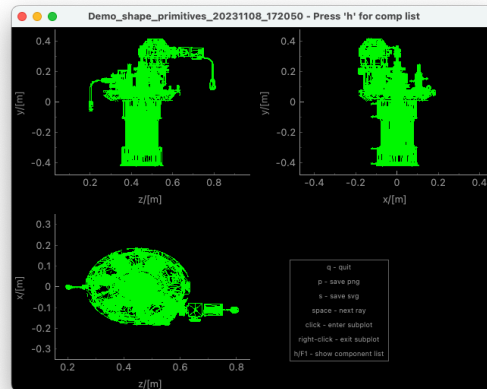
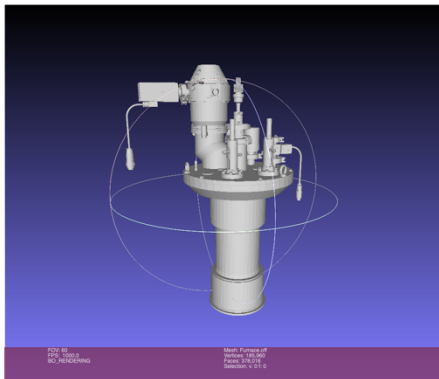


Help us improve support for e.g. STEP or STL geometries



Supervisor	?	Code difficulty	★★★★☆
Co supervisor	Peter Willendrup, peter.willendrup@ess.eu	Physics difficulty	★★★☆☆

DESCRIPTION

Neutron scattering is an investigative technique that examines matter at the atomic scale, particularly the distances between atoms in crystals. This process involves placing a sample in a neutron beam. By analysing the scattering patterns of these neutrons, researchers can infer the sample's properties. Instruments used in these experiments are highly specialized for various types of samples and scattering methods.

The European Spallation Source, nearing completion in Lund, Sweden, houses 15 such instruments. These instruments have all leveraged Monte-Carlo ray-tracing for their design, a method that predicts performance in terms of neutron intensity on the sample and the resolution of detected signals. McStas is a popular software tool for this purpose and mainly developed in Denmark.

Most of our simulated material geometries are “simple”, i.e. cylinders, spheres or boxes, but there is an increasing interest in “CAD”-like geometries. We have some support of so-called OFF-geometries, but the system is unfortunately not very robust.

This project aims to help us survey/investigate suitable existing open-source C-libraries for CAD geometries with the aim of establishing initial prototype McStas support of e.g. the popular STEP or STL formats well-known from the 3D-printing world.

REQUIREMENTS

Experience with the Python and C programming languages

Knowledge of / interest in 3D-modelling / 3D-printing / CAD tools and software

LINKS

<https://www.mcstas.org>

Matchmaking Day 2023 Engineering physics and companies meet