# Opticks@GPU 项目简介

1. **导师及课题组介绍**
2. 导师介绍链接

Simon C Blyth

<https://juno.ihep.ac.cn/~blyth/>

<https://bitbucket.org/simoncblyth/opticks/>

1. 课题组介绍（导师提供）

The student will work with Dr Simon C Blyth author of the Opticks open source package and Yuxiang Hu an experienced graduate student.

1. **科创计划项目简介**

1、项目简介

The Opticks open source software package uses GPU ray tracing from NVIDIA OptiX to accelerate optical photon propagation in Geant4 based detector simulations such as the JUNO simulation.

2、使用的实验方法、仪器设备、数据软件等

The task will give experience of cutting edge software development using NVIDIA CUDA, NVIDIA OptiX and Opticks using a high performance GPU workstation.

3、对学生专业知识背景等方面的要求

Students must have a strong interest in software development and familiarity with C, C++, python. Interest in computer graphics will be beneficial. Comfort with spoken and written technical communication in English is a requirement.

4、项目预期目标、成果和收获

Constructive Solid Geometry (CSG) is a way to describe complex shapes by combination of simple constituent solids that are represented by a tree of operators and leaf primitives. The goal is to develop an alternative way to find intersections between rays representing optical photons and complex shapes and then compare intersection performance between alternative algorithms.

1. **其他说明**

Part of the task will be to verify correctness of the intersections using GPU ray traced visualizations of detector geometry.

Advanced students will also be able to contribute to improving the interactive visualizations using NVIDIA OptiX and OpenGL.

Very advanced students could progress to using WebGL javascript 3D graphics libraries such as Three.js, BaBabylon.js

Or  <https://hepsoftwarefoundation.org/phoenix/> to develop detector geometry visualization via web browsers.