

ABSTRACT

- 5 **INTRODUCTION:** EGS5 is the state-of-the-art implementation of the Electron Gamma Shower (EGS) Monte Carlo code system, which is written purely in Fortran language. The Fortran language is an efficient computer language for numerical calculation, however, it is much limited in functionalities like GUI, plotting. In order to make EGS5 an easy-to-use tool, a Python programming interface to EGS5 and a pythonic Monte Carlo simulation environment for radiation transport calculations has been developed, referred to as PyEGS5.
- 10 **METHOD AND MATERIALS:** With binding to Python, PyEGS5 can be used in a scripting and interpreted way, while maintaining the efficiency of the Fortran binary code. As a powerful modern programming language, Python brings to EGS5 many advanced programming features and resources, with which users can create full-featured Monte Carlo simulation applications with much less efforts than using Fortran language.
- 15 **RESULT:** PyEGS5 is a very useful tool in medical physics research, fast-prototyping of medical physics devices and teaching Monte Carlo simulation to medical physics students. PyEGS5 will be provided as an open source code to anybody who requires it, under the general GNU license (GNL).
- 20 **CONCLUSION:** PyEGS5 provides the medical physics community with an easy-to-use programming interface to EGS5 code system which combines the advantages of the Python language and the Fortran language.