AbstractID: 5505 Title: Tools for integrating Monte Carlo dose engines with a radiotherapy planning system

Purpose: Monte Carlo simulations represent the gold standard in radiotherapy dose calculation. While numerous tools have been developed to facilitate accelerator and patient modeling within a Monte Carlo simulation, there are few commonly available tools for interfacing a Monte Carlo dose engine with a fully-featured treatment planning software package. We report on the development of tools to integrate a Monte Carlo dose engine with clinically useful radiotherapy planning software.

Method and Materials: The initial release is configured to operate with PLanUNC, a freely available open-source radiotherapy planning tool. The Monte Carlo integration package consists of several modular scripts and programs that act as a bridge between the treatment planning software and the Monte Carlo dose engine.

Results: Using PLanUNC as a front end for the Monte Carlo, the user can develop a treatment plan, export beams and patient information to the Monte Carlo, recover the dose distribution, and analyze the results of the calculation in PLanUNC according to isodose, DVH, or EUD, as well as compare the results of the Monte Carlo simulation with results from other calculations.

Conclusion: The Monte Carlo interface package facilitates the clinical use of Monte Carlo by allowing a fully-featured radiotherapy planning suite to be used as a front end, allowing flexible treatment planning and analysis of the Monte Carlo results. The modular nature of the software makes it straightforward to adapt these tools for use with other treatment planning software packages.