

AbstractID: 5546 Title: Monte Carlo Simulation of Backscatter in a Flattening Filter Free Clinac

Purpose: Report the influence of backscatter to the chamber signal in a flattening filter free Varian 2100 Clinac.

Method and Materials: Monte Carlo simulations of the chamber signal as a function of various field sizes in a flattening filter free treatment head were performed with MCNPX. Benchmarking simulations were carried out with a flattening filter in the beamline and compared with published results.

Results: The measured and calculated backscatter contribution to the ionization chamber signal of a system with a flattening filter showed good agreement with published data. Simulations without the flattening filter showed no significant differences to the data with the flattening filter .

Conclusions: Backscatter into the ionization chamber must be taken into account, when interpreting dose to a patient, because the monitor chamber signal will change as a function of field size. In the case of a flattening filter free beamline, the differences to a standard beamline are smaller than the statistical uncertainties of both measurements and simulations, and it can be treated as a conventional setup with a flattening filter.

Experiments and simulations did not show evidence of any additional effects on backscatter, when the flattening filter is removed from the system.

Conflict of Interest: Research is sponsored by Varian Medical Systems