

Title of Project: Modelling of a laser interferometer for pseudo-calorimetric dosimetry in Microbeam radiotherapy

Project Number: 274

University Project Leaders/Departments: Dr Juergen Meyer; Physics and Astronomy

Brief outline of project

Microbeam radiotherapy (MRT) is an emerging experimental technique, in which synchrotron-generated, highly modulated x-ray beams of microscopic dimensions are used to treat cancer. In order to be clinically applied to humans, a thorough experimental characterisation of the microbeam dose profiles is required prior to treatment; however the distinctive comb-like structure of the beams presents difficulties for conventional dosimetry techniques. The overall aim of this research is to develop a novel pseudo calorimetric dosimetry system based on holographic interferometry that is capable of determining the dose profiles for synchrotron-generated microbeam radiation.

In an ongoing PhD project an experimental laser optic set-up has been built but in the absence of a synchrotron beam it has been difficult to verify the results before actual experiments can be carried out under realistic conditions. In particular, to extract the relevant information, i.e. how much radiation dose has been absorbed in a given medium, a mathematical reconstruction is required. To verify and finetune the reconstruction approach simulated “ideal data” is necessary.

Specific student requirements:

Please indicate below any specific academic requirements you have for the summer scholarship student (e.g., specific level; specific courses, or equivalents, completed)

This project requires someone with good programming skills. Prior knowledge of interferometry and Mathematica is desirable but not essential.

Special condition:

Possible that some out of hours work may be required as part of the project