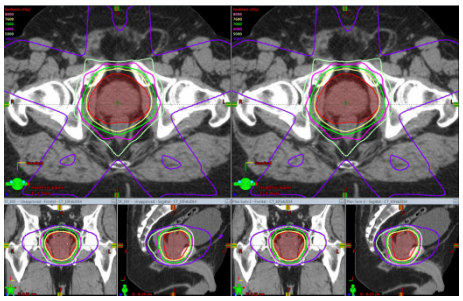
A system for expanding the available photon energies in radiation therapy

Unmet Need

Radiation treatments are mostly delivered using a medical linear accelerator (linac). Currently, because of the complexity of the linac engineering and the requirement of the dose rate output, the standard design of a linac only allows two to three photon energies to be available. Should more photon energies be desired on a single linac, a significant increase in the cost of engineering, manufacturing, commissioning and maintenance would arise. The choice of photon energy in the treatment plan is currently based largely on experience of the operator and the available photon energies on the linac. There is a need to improve photon energy access in order to improve treatment plans and patient outcomes.

Technology

Duke inventors have reported a system for expanding the available photon energies used with traditional radiation treatments. This technology is intended to be incorporated into existing linacs or used to develop a new linac design. This technology is capable of synthetically producing a photon beam of arbitrary “effective energy” using only the nominal photon energies available on a given linac. This is done with a weighted combination of the nominal photon energies and can vary based on gantry angle and patient anatomy. In doing so, treatment plans can be made portable between linacs with different operating energies. Treatment planning systems will also be able to optimize over a continuum of effective energies, which may vary in space and gantry angle. This provides complete flexibility in the possible solution space to the treatment plan design. A prototype is in development.



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Meet the Inventors

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Publication(s)

External Link(s)

• From the lab of Dr. Qiuwen Wu

Advantages

- Can achieve decreased costs, better treatment plans and improved patient outcomes compared to traditional radiation therapy
- Offers a method for more conformal radiation doses with less dose to surrounding critical organs
- A synthetic photon radiotherapy technique that can match any given energy photon beam characteristics
- Can be realized with existing linacs