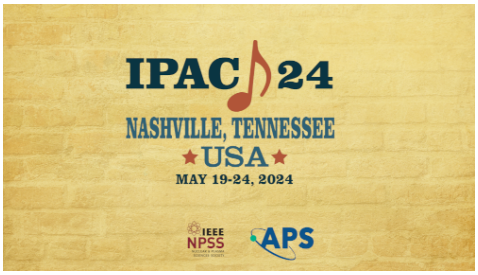

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Focusing of high-energy electron beam using silicon crystals for application in radiotherapy

Thursday, 23 May 2024 16:00 (2 hours)

By using a high-energy electron beam (beam energy of several hundred MeV) strongly focused on the tumor lesion area, radiotherapy can be performed with a relatively simple beam generation and handling system while resulting in a suitable shape of the deposition energy curve in a tissue-like material. Quadrupole magnets are typically used for beam focusing, which makes the beam delivery system complex and challenging from an engineering point of view. In the Geant4 simulation toolkit, we performed a feasibility study of an alternative solution, in which focusing is achieved by using a bent silicon crystal with an appropriately shaped exit surface. However, the focusing strength is still not high enough. Research to find the optimal crystal shape to achieve the ideal focusing strength is ongoing. Such a crystal lens can be a very light object (mass in the order of grams), allowing for a much simpler beam delivery system for radiotherapy facilities.

Footnotes

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