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A Novel X Ray Source for Cancer Radiotherapy ILIJA DRAGANIC, National Institute of Standards and Technology, Gaithersburg, MD 20899-8422, USA, JACEK CAPALA, National Cancer Institute, National Institute of Health, Bethesda, MD 20892, USA, JOHN GILLASPY, National Institute of Standards and Technology, Gaithersburg, MD 20899-8422, USA — There is a growing interest in exploring the possibility of replacing conventional broadband x-rays used in biomedicine with narrowband x-rays. In a form of binary therapy, drugs containing heavy elements are made to preferentially concentrate in cancer cells, and then the x-ray wavelengths are tuned to match the photo absorption peaks of the heavy elements. Synchrotrons can provide the necessary x-ray beams, but are impractical for routine therapy. An EBIS/T device may be a suitable alternative. EBIS/T devices can produce slow highly charged ions (HCI) which can be easily transported into the body through a cannula, where they produce relatively monoenergetic x rays within the tumor. In order to achieve the highest charge states with sufficient fluence for use in biomedicine, a better understanding of the EBIS/T ion trap dynamics may be required. This work will address the optimal ion temperatures, spatial distributions, densities, and related parameters of HCI in the trap using optical spectroscopy.

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