

AbstractID: 11909 Title: Carbon nanotube field emission based imaging and irradiation technology development for basic cancer research

Carbon nanotube (CNT) field emission is an emerging nanotechnology enabling the development of novel x-ray imaging and radiation delivery systems for basic cancer research and clinical application. In this presentation a brief overview of the CNT nanotechnology and its recent development in the application of micro-CT imaging, micro-RT, cellular and tissue level microbeam irradiation will be presented.

The CNT field emission technology based systems have clear potential advantages over conventional imaging and irradiation systems based on thermionic emission. Micro-RT and micro-CT systems that are based on thermionic emission technology commonly rely on a single radiation source and the imaging and irradiation depend on source rotation and thus can lead to poor temporal resolution for small animal research. The CNT field emission based systems employ individually addressable multipixel cathode array radiation sources and thus are capable of high temporal resolution, static (no rotation) imaging and electronically shaping a small radiation field and its intensity map. In clinical application, a CNT field emission based imaging and irradiation system can also improve treatment/imaging efficiency and improve patient throughput.

Learning Objectives:

1. Understand basic principle of carbon nanotube field emission technology and its potential in imaging and irradiation technology development for cancer research and clinical application
2. Understand current status of the CNT field emission based imaging and irradiation technology development
3. Understand the basic achievements and challenges in the technology development.

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Conflict of interest: Zhou is the Chairman of Xintek, Inc. and a board member of XinRay Systems, LLC