Argonne NATIONAL LABORATORY

PHY Seminar

Physics Division Seminar

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Prospects for a Linac-based Heavy Ion Therapy Center at ANL/Chicago Area

Host: Shaofei Zhu

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Argonne National Laboratory and the Department of Radiation and Cellular Oncology at the University of Chicago (UChicago) are investigating the feasibility of developing an innovative heavy ion therapy (HIT) center by combining an advanced compact heavy ion linac (ACCIL) designed at Argonne with real-time image-guided therapy from UChicago. The proposed technology will not only be the first linac-based heavy-ion therapy technology in the world, with the advantage of much desired fast energy and ion switching capability, but also the first real-time image-guided heavy ion therapy modality. ANL has a prime location to house such a development within existing infrastructure and radiation enclosure at the old Intense Pulsed Neutron Source (IPNS) site. The cost of developing the technology and building a linac-based HIT facility on the existing ANL site will be significantly lower than the "green field" carbon ion therapy (CIT) centers proposed elsewhere. Such a facility would prove a unique platform to stage the development of pre-clinical studies to prepare for FDA clearance for carbon and other ion beam therapies in the US, and pave the way to establishing a clinical therapy facility in the Chicago area. In addition to discovery science in high-gradient accelerator physics and the development of superconducting heavy-ion gantry for therapy delivery coupled with real-time guidance, the proposed facility will enable a breadth of research and applications, and as such, will serve as the advanced particle therapy research center in the US. We name in particular cellular radiobiology research, comparative studies of different ion beam therapies and the development of real-time imaging for precise and accurate dose delivery. The ANL/UChicago Advanced Heavy Ion Therapy Center initiative will seek regional and nationwide collaboration once the feasibility study is completed.