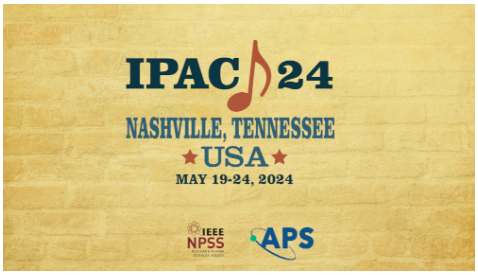

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CXLS ionizing and laser radiation safety interlock systems

Sunday, 19 May 2024 16:00 (2 hours)

The Compact X-ray Light Source (CXLS) requires the acceleration of electron bunches to relativistic energies, which collide with focused IR laser pulses to produce X-rays which are then transported to the experiment hutch. A class 4 UV laser is used at the photocathode to liberate the electrons that are generated via the photoelectric effect. During electron acceleration bremsstrahlung radiation (gamma and neutron) is generated through electron interactions with solid matter. In the experiment hutch the X-rays then interact with the sample under test in pump-probe configuration where the pump laser is another class 4 laser with a wide spectral range from deep UV to THz. Interlock systems have been designed and deployed to protect users of the facility from exposure to these ionizing and laser radiation hazards. We present the design architecture of CXLS interlock systems. In this description we make clear what systems are independent, and which are interdependent and what administrative override modes are made available and why. We also provide an overview of our monthly interlock system testing protocols and conclude with comments on overall system performance.

Footnotes

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