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Radiation Dosimetry at Superconducting Electron Linac Modules driving a FEL using Radiochromic Films and Bubble Detectors

In April 2006, the Free Electron Laser (FEL) generating 13 nm laser light with a high brilliance started its routine operation at DESY. The FEL facility is named FLASH (Free Electron Laser in Hamburg), driven by a 145 m long, 1 GeV superconducting electron linac. A myriad of state-of-the-art electronic devices comprised of microelectronic components, which are susceptible ionising radiations have been installed in the close proximity of the FLASH linac, producing a significant level of parasitic radiations during its routine operation. We have evaluated the gamma and neutron doses along the entire length of the linac at different operating conditions using radiochromic films and superheated emulsion (bubble) detector respectively. This report highlights the methods and results of in-situ dosimetry of neutron/gamma mixed radiation fields produced by 1 GeV superconducting electron linac driving the FLASH.

Author: MUKHERJEE, Bhaskar (DESY)

Presenter: MUKHERJEE, Bhaskar (DESY)