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Radiation safety for high power laser applications

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With the development of chirped-pulse amplification ultra-short lasers with femtosecond pulse durations have become readily available and are used in numerous applications such as material processing or plasma-based accelerators. In most cases, these lasers are focused to small spot sizes, exceeding intensities of 10^{13} W/cm^2 and thus the ionization threshold in most materials. As this can lead to the production of x-rays, national law in Germany made it mandatory to monitor the dose rate from all laser setups exceeding this intensity threshold. At Deutsches Elektronen-Synchrotron DESY, research has now started to further investigate and understand the production of x-rays in different materials and gases to enable safe working conditions and compliance with the legal framework while maintaining the flexible workflow required at universities and research institutes. This poster gives an overview of studies already conducted on this topic, shows plans for the research at DESY and invites to discuss implications for future work in the development of plasma accelerators.

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