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Laser technology for future accelerator driven photon sources

Ultrafast lasers are one of the enabling technologies for X-ray and XUV FEL facilities. The requirements for those facilities'daily operation and experiments place challenging demands on the stability and versatile configuration of ultrafast optical lasers for the FEL electron source, for FEL seeding and for pump-probe experiments. We will give an overview of recent ultrafast laser developments for the X-ray FEL facilities FLASH and European XFEL in Hamburg and discuss how the requirements for future FEL facilities and future compact electron- or laser driven X-ray and XUV sources will push the frontiers for high peak and average power, precision timing, and stability and reliability of ultrafast lasers. Here we identified within Helmholtz a substantial overlap in future technology requirements in the programs "From Matter to Materials and Life"(MML), "Accelerator R&D"(ARD) and "Space", providing ample opportunity for collaborations and joint efforts.

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