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Modular high-power laser systems at LCLS

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LCLS will be employing high-power femtosecond pulse lasers concurrent with the high energy beamline upgrade. At the X-ray pump-probe (XPP) instrument, the laser travels through a 40-meter long conditioning system from its source to the interaction point on the end station. This Modular Optical Distribution System (MODS) provides the supporting infrastructure for capabilities such as pulse compression and generation of harmonics, terahertz, white light, and visible to mid-infrared wavelengths. Tabletop Integrated Laser Elements (TILEs) allow for quick and repeatable transition of functionalities as well as maintenance that does not impede on experiment time. The laser is kept within a Class 1 enclosure for a majority of its path and accommodates an alternating 600 mm shift in beamline position. The MODS and TILE concepts have been implemented at other LCLS instruments and lessons learned will be applied to the system at XPP.

Footnotes

Funding Agency

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