

Bright Coherent and Incoherent X-ray Generation at Colorado State University

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This overview talk will review recent results of the generation and application of soft x-ray laser radiation and bright ultrashort pulses of incoherent hard x-ray and gamma radiation at Colorado State University. The demonstration of multi-Hz repetition rate gain-saturated soft x-ray laser plasma amplifiers at wavelengths down to 6.8 nm will be presented. We will also summarize results of the excitation of plasma-based collisional soft x-ray lasers using trains of pulses of arbitrary shape, the resulting improvement in soft x-ray laser efficiency, and the design of a programmable high energy laser pulse synthesizer developed for that purpose. We will also present results of the generation of bright pulses of hard x-rays and gamma rays using a petawatt-class laser capable of operating at up to 3.3 Hz repetition rate in burst mode. Result of this project in collaboration with Los Alamos National Laboratory include the application to x-ray tomography.

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