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Phase-contrast imaging and femtosecond stroboscopy with an ultrafast laser-based hard x-ray source J.C. KIEFFER, R. TOTH, INRS, A. KROL, SUNY Upstate Medical University, S. FOURMAUX, INRS, J.L. BOURGADE, CEA — We investigated performance of ultrafast laser-based x-ray source for phase contrast imaging in 2D projection imaging and in enhanced micro-CT imaging. Good quality images were obtained in the single energy and multiple energy, *in line* phase-contrast enhancing geometry using x-ray line energy matching object thickness and density. Phase information has been inferred from images obtained at the same x-ray energy but at different object-to-detector distances and also from images obtained at the same object-to-detector distance but with different K-alpha line energies. We demonstrated that ultrafast laser-based, compact, x-ray source is a promising technique for micro-CT system, allowing practical implementation of dual-energy and phase-contrast imaging micro-CT that is not possible with conventional micro-CT. In addition, by carefully controlling the excitation conditions and the target design, it is possible to generate K-alpha radiation pulses with a few hundreds of femtosecond in duration. Thus it becomes possible to combine phase contrast imaging and femtosecond time scale with a femtosecond phase-contrast stroboscopy technique based on ultrafast laser produced K-alpha radiation flash. This laser-based technique could open new opportunity for ICF diagnostics (target control, femtosecond and picosecond imaging of hydro-instability dynamics, shock wave propagation etc..).

Jean Claude Kieffer
INRS, Univ. du Quebec

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