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Investigations on Dual Pulse technologies for future upgrade of CEA flash X-rays LIA

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X-Ray flash radiography is a useful diagnostic to investigate the structural response of matter under impulsive loading during hydrodynamic experiments. In addition to multiple axis capability, multiple pulses design for future upgrade of LIA machine(s) is under investigation at CEA. The major design changes of a dual-pulse LIA compared to the existing and operational one at EPURE (ex-AIRIX) are: the injector, the HV generators driving the induction cells and the electron / X-rays conversion target. CEA has developed a dual-pulse HV generator using coaxial water lines connected in series. This design has been successfully tested and reliability evaluation is ongoing. About the injector, CEA choose to investigate an induction push-pull design. Preliminary design is in progress and the main validation steps to reach a complete feasibility demonstration are identified. Finally, studies on the target material behavior under strong energy density deposition have started using numerical models and simulations tools. A complete experimental programme has been established along the coming years to gain and confirm understanding required for an optimized design. Overall coherence of those studies and several recent achievements will be presented.

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