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## Experimental Demonstration of Inverse Compton Scattering Source in a Pulse Train Mode at 40 MHz

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Semiconductor industry needs economically viable light sources operating at 13.5 nm, to power the next generation lithography tools. FEL is presently considered as a possible solution for a non-granular topology, where a single source provides power to multiple scanners at the high volume manufacturing facility. Such FEL would have to generate 10s of kW of average power, and offer uptime and reliability consistent with the industry standards. To develop such machine, a high e-beam-to-light conversion efficiency has to be achieved, either by beam energy recuperation, or in a single pass configuration by advanced tapering scheme. We review these options, and also discuss a novel approach termed TESSA, which uses high gradient stimulated deceleration in a strongly tapered undulator to achieve as much as 50% power conversion efficiency from e-beam to EUV light.

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