Recent progress on laser plasma accelerator and platform laser system for multi staging laser electron accelerator on the ImPACT project at Osaka University

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Since laser wakefield acceleration (LWFA) has a potential to produce high-quality ultrafast electron beam, it is considered as an electron source of a compact X-ray free electron laser (XFEL). The application requires high-beam quality such as low divergence, narrow energy spread, short pulse and stability.

We are proceeding to demonstrate staging of laser-plasma accelerators on IMPACT project at Osaka University. Staging laser electron acceleration experiments are being prepared to demonstrate a stable, more than one GeV electron beam with small energy spread (1%) and high peak current, aiming an XFEL around one keV.

We are constructing new laser system for the staging laser accelerator. The system consists of three laser pulses: (1) 1 J, 20 fs for injector, (2) 2 J, 50 fs for phase rotator, and (3) 10 J, 100 fs for booster. The detail of the progress on the construction of the laser system will be presented.

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