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Current status of LWFA development towards robust table-top XUV-FEL

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In order to develop a stable LWFA based accelerator and demonstrate FEL generation, the unique LWFA platform was constructed in the RIKEN SPring-8 center and systematic experiments have being conducted financially supported by ImPACT (2013-2018) and JST MIRAI (2018-) programs. Although undulator radiation in an XUV spectral range driven by LWFA electron beams was successfully demonstrated on the platform in 2019, the sufficient reproducibility was not obtained due to the poor electron pointing stability and large energy fluctuations. In order to solve the above problems, the accelerated electron beam quality has been improved by developing the Shock injection scheme enabling a precise injection control and a stable plasma condition. This development has dramatically improved the reproducibility and stability of the LWFA electron beam. The preliminary proof-of-concept experiment has recently demonstrated the clear amplification of the undulator radiation and the possibility of LWFA based FEL in XUV range. The talk will be presenting the outline of the LWFA platform, the setup of a proof-of-concept experiment focusing on key improvements and obtained results.

Footnotes

Funding Agency

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