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Light source top-up through direct generation of electron beam based on LPA technology

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Laser plasma acceleration (LPA) technology is advancing day by day, getting ready for user facility applications. LPA might be applicable to a generation of electron beams directly within the light-source storage-ring vacuum chamber. Typical injector of the light source facility consists of linac and synchrotron booster (or simply a full energy linac). It can be replaced by a laser plasma cell and a driving laser system that can generate multi-GeV electron beams through so-called self injection. The electron beam out of plasma cell has typically a large energy spread. In this application, however, we do not require small energy spread since the storage ring can accept off-energy electrons of up to $\pm 5\%$ or so. It can also have a transverse angular acceptance of a few hundred micro radian. Therefore, a large fraction of generated electrons can be eventually accepted by the storage ring. LPA system, which replaces the conventional injector, may contribute to significant energy saving.

Footnotes

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Europe

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