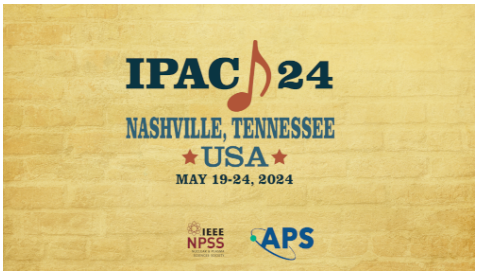

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Study on high energy coupling efficiency of laser-electron interaction via vortex beam

Monday, 20 May 2024 16:00 (2 hours)

Manipulation electron beam phase space technology by laser-electron interaction has been widely used in accelerator-based light sources. The energy of the electron beam can be modulated effectively under resonant conditions by using an intense external laser beam incident into the undulator together with the electron beam.
Enhancing the modulation efficiency is crucial for the performance of high repetition rate seeded free electron lasers (FELs) and other related devices.
In this paper, we propose a new scheme to augment the efficiency of laser-electron interaction by employing the interaction between a vortex beam and an electron beam within a helical undulator. Three-dimensional time-dependent simulation results indicate that the modulation repetition rate of laser-electron interaction using a vortex beam can be improved by one order of magnitude over the conventional Gaussian beam at the same input power.

Footnotes

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