IPAC'24 - 15th International Particle Accelerator Conference



Contribution ID: 580 Contribution code: TUPG69

Type: Poster Presentation

Tunable laser pulses enable the generation of femtosecond electron beams with controllable lengths

Tuesday, 21 May 2024 16:00 (2 hours)

In ultrafast electron diffraction experiments, the electron beam's length is crucial as it determines the timescale for observing ultrafast dynamic changes. Therefore, achieving continuous control over the length of these beams within a specific range is paramount for broadening the research scope in ultrafast science. This regulation ensures the accuracy of diffraction images from diverse samples, precise electron beam length measurement, and effective generation of terahertz radiation. Currently, typical methods employ radio frequency (RF) cavity compression to manage electron beam length. Nonetheless, this approach introduces time jitter and encounters challenges in continuously adjusting the electron beam length due to constraints of the RF cavity structure. This paper focuses on compressing femtosecond laser pulse methods to obtain laser pulses with continuously adjustable pulse widths. Subsequently, further controlling the distribution of photoemission electron beams can enhance the temporal resolution of ultrafast electron diffraction.

Footnotes

Funding Agency

Huazhong University of Science and Technology

Paper preparation format

Word

Region represented

Asia

Primary author: LI, Jiapeng (Huazhong University of Science and Technology)

Co-authors: TSAI, Cheng-Ying (Huazhong University of Science and Technology); WANG, Jian (Huazhong University of Science and Technology); YANG, Jinfeng (Osaka University); FAN, Kuanjun (Huazhong University of Science and Technology); MESHKOV, Oleg (Budker Institute of Nuclear Physics); YU, Shuochun (Huazhong University of Science and Technology); LIU, Zhengzheng (Huazhong University of Science and Technology)

Presenter: LI, Jiapeng (Huazhong University of Science and Technology)

Session Classification: Tuesday Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.T25 Lasers