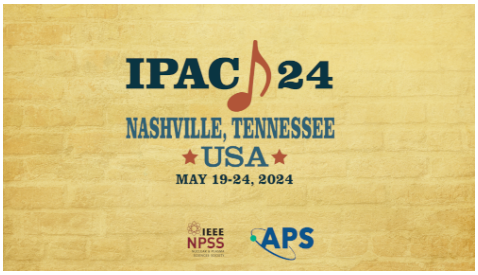

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Generation of high brightness electron beams by the 2.4-cell photocathode RF gun

Wednesday, 22 May 2024 16:00 (2 hours)

Modern accelerator facilities consistently require electron beams with improved characteristics such as shorter bunch lengths and higher brightness. To meet this demand, this study proposes a 2.4-cell photocathode electron gun, aiming to enhance the extraction electric field gradient on the cathode to produce high-quality beams. By effectively increasing this gradient, space charge effects in the low-energy region are suppressed, resulting in superior beam quality. Detailed design of the cavity is provided in this paper, along with a comprehensive assessment of the gun's performance through beam dynamics simulations. The simulation results demonstrate that the 2.4-cell electron gun can generate electron beams with shorter bunch lengths and lower longitudinal emittances compared to the 2.6-cell electron gun configuration.

Footnotes

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Primary author: QI, Hong (Huazhong University of Science and Technology)

Co-authors: WANG, Jian (Huazhong University of Science and Technology); LIU, Zhengzheng (Huazhong University of Science and Technology); TSAI, Cheng-Ying (Huazhong University of Science and Technology); YANG, Jinfeng (Osaka University); FAN, Kuanjun (Huazhong University of Science and Technology); XU, Yang (Huazhong University of Science and Technology)

Presenter: QI, Hong (Huazhong University of Science and Technology)

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