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Design and optimization of a compact electron linac for iIndustrial applications using Bayesian optimization

Tuesday 27 August 2024 16:00 (2 hours)

This work presents the design and optimization of a compact electron linear accelerator capable of achieving an energy less than 5 MeV, specifically tailored for industrial applications. The innovative design incorporates a Superconducting RF photoinjector. A significant focus has been placed on optimizing the geometry of the SRF photoinjector cavity to accelerate high-charge and small-emittance electron beams. Utilizing Bayesian optimization, the linac configuration has been refined to enhance both the geometry and performance of the photoinjector, leading to improved beam quality and energy efficiency. Our findings demonstrate that the optimized linac meets the stringent requirements of industrial applications and significantly enhances beam dynamics and operational stability.

Footnotes

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