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Investigation of beam generation in laser back-illumination mode using metal cathodes of varying thickness in a photocathode DC electron gun

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This study focuses on beam generation in the laser back-illumination mode using metal cathodes of varying thicknesses in a 200-kV photocathode DC electron gun. The aim is to investigate the quality and characteristics of beam production in this mode and provide valuable insights for the application of the electron gun in electron microscopy and related fields. Experimental preparations involved the fabrication of metal cathode samples with different thicknesses. The 200-kV photocathode DC electron gun was then utilized to generate beams under various settings, specifically in the laser back-illumination mode. Beam quality and characteristics, including beam emittance, space charge effects, and energy spread, were measured and analyzed. The results indicate a significant influence of metal cathode thickness on beam quality in the laser back-illumination mode. These findings contribute to the understanding of beam production characteristics and provide guidance for optimizing electron gun design, particularly for applications in electron microscopy.

Footnotes

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Paper preparation format

Region represented

Asia

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