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Novel Fabrication Methods and Geometries of Nanoblade Cathodes

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Electron beams serve many important roles from free electron lasers to medical imaging. Every time beam brightness is improved, a wide variety of fields take another step forward. Nanopatterned field emission cathodes serve as an excellent opportunity to continue to push the envelope on extreme high brightness beams. Their fabrication is thus of crucial importance to this objective. In the past KOH wet etching was performed to create two atomically sharp ridges. This is done by leveraging the selectivity of KOH to etch along a single plane in the silicon crystal. This process is generally used in micro-machining to create a whole array of atomically sharp ridges and cannot be used to produce less than 2. By adopting a different nanofabrication process, a single ridge can be isolated. Additionally, more flexible nanofabrication techniques can be employed to create novel arrangements of blades, such as concentric rings of ridges.

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Footnotes

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Yes

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