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Multiplication of field enhancement factors on field-emission cathodes RYAN MILLER, University of Wisconsin, Y.Y. LAU, University of Michigan, JOHN BOOSKE, University of Wisconsin — Of great interest to high power microwave, millimeter wave to terahertz sources, x-ray tubes, electrons guns, etc., is the field enhancement obtained from emitting structures fabricated by laser ablation or various microfabrication methods [1]. Here we extend our conformal mapping theory [2] to a quadrilateral-cross-section double ridge, and show that the net field enhancement factor of the double ridge with a micro-protrusion on top of a macro-protrusion is equal to the product of the individual protrusions' field enhancements [3] over a very wide range of dimensional aspect ratios. Significant deviation from this product rule, conjectured by Schottky [3], occurred almost exclusively when the width of the macro-protrusion is less than the height of the micro-protrusion. This work was supported by an AFOSR Cathodes and Breakdown MURI04, AFRL, L-3, and Northrop-Grumman. [1] J. H. Booske, Phys. Plasmas **15**, 055502 (2008). [2] R. Miller, Y. Y. Lau, J. H. Booske, Appl. Phys. Lett. **91,** 074105 (2007). [3] W. Schottky, Z. Physik **14**, 63 (1923).

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