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Interface Band Structure Effects upon Hot Electron Transport Across Non-Epitaxial Metal-Semiconductor Interfaces JOHN GARRAMONE, Department of Materials Science & Engineering, McCormick School of Engineering & Applied Science, Northwestern University, Evanston, IL 60208-3108, JOE ABEL, College of Nanoscale Science and Engineering, University at Albany, SUNY, Albany, New York 12203, USA, SALVADOR BARRAZA-LOPEZ, Department of Physics, University of Arkansas, Fayetteville, AR 72710, USA, VINCENT LABELLA, College of Nanoscale Science and Engineering, University at Albany, SUNY, Albany, New York 12203, USA — The interface band structure of a semiconductor is shown to affect the transport of hot electrons across a non epitaxial metal-semiconductor interface. This is observed by measuring the hot electron attenuation length of Ag utilizing ballistic electron emission microscopy (BEEM). The attenuation length is observed to increase sharply for energies approaching the Schottky barrier height when deposited upon Si(001) substrates and decrease slightly when deposited upon Si(111) substrates. A theoretical description demonstrates that this is due to conservation of parallel momentum and differences in interface band structure of the two silicon orientations. At higher tip biases the attenuation lengths converge allowing extraction of the inelastic and elastic scattering lengths in the silver.

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