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Probing the Effects of Interface Band Structure Using Ballistic Electron Emission Microscopy ROBERT BALSANO, VINCENT LABELLA, College of Nanoscale Science and Engineering SUNY Albany — Ballistic electron emission microscopy (BEEM) is a scanning tunneling microscopy (STM) technique that can measure transport of hot electrons through materials and interfaces with high spatial and energetic resolution. Using this technique an attenuation length for electrons in the film can be extracted from the relationship between film thickness and the number of hot electrons transmitted through the film. The behavior of the attenuation lengths of carriers with energies just above the Schottky barrier height is indicative of the interface band structure. BEEM requires an additional contact to ground the metal base layer of a metal semiconductor junction. Performing BEEM in situ with the sample fabrication greatly increases the through put for these types of measurements. This presentation will detail our data on electron transport through metals and across different interfaces and also highlight our work to develop a special silicon substrate that has the extra contact and oxide hard mask built in to enable in situ BEEM without modifications to the STM.

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