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Ballistic carrier injection induced electroluminescence of InAs quantum dots in a hot-electron metal-base transistor WEI YI, VENKATESH NARAYANAMURTI, Gordon McKay Laboratory of Applied Science, Harvard University, JOSHUA ZIDE, SETH BANK, ARTHUR GOSSARD, Materials Department, University of California, Santa Barbara, V. NARAYANAMURTI TEAM, A. C. GOSSARD TEAM — Utilizing hot electrons ballistically injected by a tunnel junction over the Schottky barrier into a semiconductor collector, ballistic electron emission microscopy (http://www.deas.harvard.edu/venky/pdffiles/29.pdf) BEEM characterizes carrier filtration through buried interfaces with nanometer spatial resolution. Under forward collector bias, interband light emission may occur in a heterostructure collector by injection of minority carriers with sub-bandgap kinetic energies. Such a concept, ballistic electron emission luminescence, is tested using a hot-electron metal-base transistor, the solid-state prototype of BEEM. The heterostructure collector with embedded InAs quantum dots (QDs) is grown on p-GaAs substrate. Either majority carriers (holes) or minority carriers (electrons) are injected into the collector under different collector bias. Light emission from InAs QDs, InAs wetting layer, and bulk GaAs are observed in concert with minority carrier injection.

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