

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**A New All-Optical Imaging Scheme based on QWIP technology** DEBING ZENG, GANG CHEN, RAINER MARTINI, Dept. of Physics and Engr. Physics, Stevens Institute of Technology — Infrared imaging applications have gained increasing interest over the recent decades due to favorable light propagation, night imaging as well as chemical sensing applications. However, the scalability of the existing techniques towards high resolution in the multi-megapixel range is one of the major challenges in today's IR imaging technologies. Here we present an alternative solution using an all-optical wavelength conversion scheme. QWIP has been successfully proven their potential in IR imaging applications. Yet the fundamental conversion process from IR light to electric current has been one of the major restrictions in such system. To overcome this problem we propose the use of an all-optical conversion scheme, which utilizes an interband resonant optical NIR beam to probe the electrical population of the QW structure. In this methodology the incident MIR radiation changes the occupation of the QWs, which in turn influences the NIR transmission. Hence the irradiated MIR images can be probed by spatially resolved measurement of the NIR transmission, as has been demonstrated by Nada et al. for all-optical switching purposes. In this talk we present an implementation scheme of the all-optical QWIP readout technique together with theoretical calculations of the sensitivity of the proposed device and its temperature dependence. First experimental results will be presented also. The Authors thankfully acknowledge financial support by US Army, Picatinny Arsenal.

Debing Zeng  
Dept. of Physics and Engr. Physics,  
Stevens Institute of Technology

Date submitted: 17 Jan 2006

Electronic form version 1.4