Abstract Submitted
for the CAL09 Meeting of
The American Physical Society

Imaging Transport in Nanowires with NSOM LEE BAIRD, Naval Postgraduate School — A novel system has been developed for the imaging of carrier transport within semiconductor nanostructures by operating a near field scanning optical microscopy (NSOM) within a scanning electron microscope. Luminescence associated with carrier recombination is collected with high spatial resolution to monitor the motion and recombination of charge generated by use of an electron beam as an independent point source. Light is collected in the near field from a scanning fiber using tuning fork feedback in an open architecture combined AFM/NSOM system allowing for independent motion of sample and tip. From a single image, it is possible to obtain a direct measure of minority carrier diffusion length. This technique has been used in the near-field collection mode to image the diffusion of holes in n-type GaN-AlGaN core-shell nanowires, grown via Ni-catalyzed MOCVD. Measurements were made on tapered nanowires ranging in diameter from 500 to 800 nm, with lengths up to $\sim 30\mu m$. The average 1-dimensional carrier diffusion length was measured to be 1.2 +/- 0.2 μm in the low injection limit. In addition, it is possible to map the luminescence that is wave-guided to the end of the structure, imaging waveguide modes

Abstract APS

Date submitted: 22 Oct 2009 Electronic form version 1.4