

# Optical limiting by absorption bleaching in carbon nanotube devices: comparison of field-induced and electrochemically-induced charge injection

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**Abstract** We studied direct charge injection in a heterogeneous film of single-wall carbon nanotubes using the technique of charge-induced absorption. We found that the injected charges screen the excitons in the semiconducting tubes, reducing their binding energy and transferring oscillator strength from the exciton transitions to free carriers. These effects parallel those of the electrochemical doping in the same samples. Furthermore, we interpret the bleaching bias in the electroabsorption (a chi-3 process) in isolated SWNT as being due to injected charges, which has implications for a variety of SWNT-based optoelectronic devices. I will discuss the experiments and some potential methods for using this effect in optoelectronic switches.

## References

- [1] W. Joshua Kennedy and Z. Valy Vardeny, Applied Physics Letters, **98** (2011) 263110.
- [2] Christoph Gadermaier, Enzo Menna, Moreno Meneghetti, W. Joshua Kennedy, Z. Valy Vardeny, and Guglielmo Lanzani, Nano Letters, **6** (2006) 301-305

## Figures

We are still working on producing some figures, and awaiting permission from co-authors.