INTERBAND MAGNETO-OPTICAL STUDIES OF SINGLE-WALLED CARBON NANOTUBES IN PULSED HIGH MAGNETIC FIELDS UP TO 65 T

S. Zaric, G. N. Ostojic, J. Kono (Rice U., ECE); J. Shaver, V. C. Moore, R. H. Hauge, R. E. Smalley (Rice U., Chemistry); S. A. Crooker (NHMFL, Los Alamos)

Introduction

We recently reported magneto-optical work on carbon nanotubes using the Hybrid Magnet, revealing some of the predicted features due to the Aharonov-Bohm effect [1]. To extend this work, we began measurements in pulsed high magnetic fields.

Experimental

The nanotube solution was contained in a quartz cell, mounted with a polarizer on a specially designed sample stick with integrated optic fibers, lenses, and mirrors. All measurements were done at room temperature.

Results and Discussion

Figure 1 shows absorption data taken with a 50 T magnet (left) and a 65 T magnet (right). Both show that the nanotubes align with the field, seen by the induced optical anisotropy. Namely, while absorption for parallel polarization (upper graphs) increases with the field, absorption for perpendicular polarization (lower graphs) decreases.

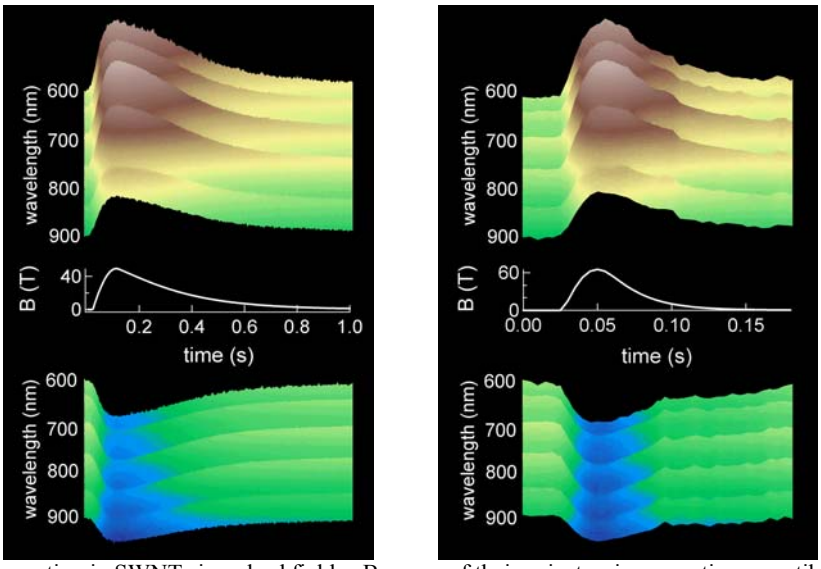

Figure 1 Magneto-absorption in SWNTs in pulsed fields. Because of their anisotropic magnetic susceptibilities, the nanotubes dynamically align in response to the pulsed magnetic fields, exhibiting time-dependent optical anisotropy.

Conclusions

We found that nanotubes dynamically align in response to the pulsed fields, exhibiting time-dependent optical anisotropy.

Acknowledgements

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References

[1] Zaric, S., *et al*., Science, **304**, 1129-1131 (2004); Nano Lett., **4**, 2219-2221 (2004).