Overview of Posters
Posters G

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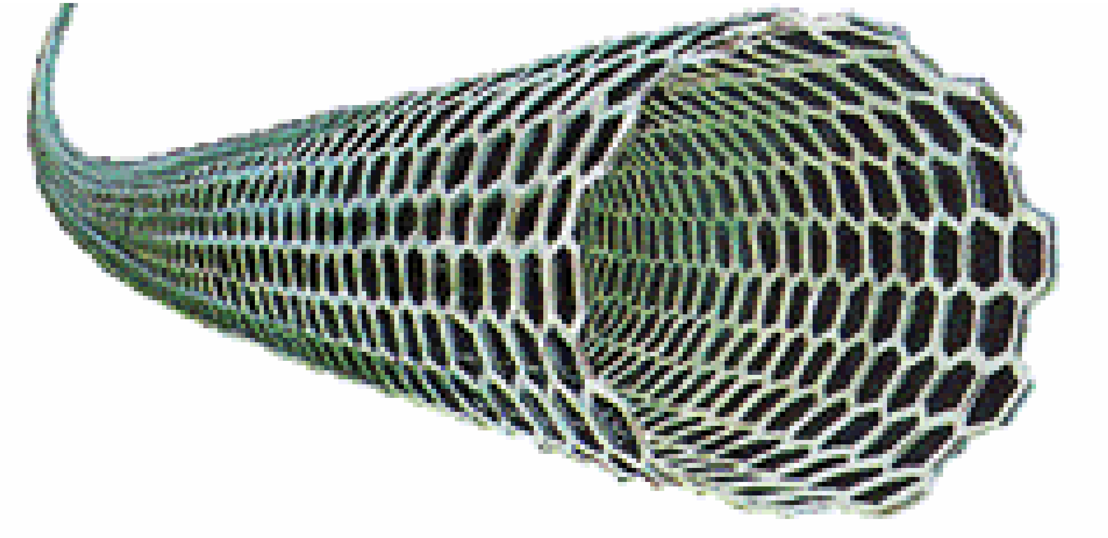

TOTAL **58 posters**

Advances in Photoluminescence →	10
Dark Excitons and other Excitonic Effects →	8
Magnetic Phenomena →	5 (2)
Non-linear optics →	3
Characterization tools →	3
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Non-optical applications →	24
- sensors	5
- doping/charge transfer	5
- FET	9
- other	5

Advances in Photoluminescence - 10

G.042 – Lefebvre – Demonstrated 8% quantum yield for suspended tubes

G.035 – Miyauchi – PL maps obtained for // and ⊥ polarization to reveal E_{12} and E_{21} transitions.

G.048 – Uryu – Calculated exciton levels for // and ⊥ polarization showing large blueshift

G.037 – Iwasaki – chirality-dependent comparison of E_{11} and E_{22} transitions in suspended and SDS wrapped SWNTs

G.031 – Yanagi – PL intensity enhanced by filling with β carotenoids

G.034 – Iakasaki – PL maps used to compare spectra from many sample types (HiPco, CoMoCAT, Carbolex…)

G.039 – Sugai –
G.040 – Okazaki – } **PL strongly suppressed in DWNTs**

G.043 – Kishi – PL from inner tubes of DWNTs identified by using calibrated SWNT/DWNT mixtures

G.030 – Minami – Weak UV light (< $4 mW/cm^2$) strongly decreases PL intensity by creating mid-IR states, and result depends on SWNT environment

Dark Excitons and other Excitonic Effects - 8

G.038 – Shaver – magnetic fields increases brightness of excitons, by admixing dark excitons to show B-induced splitting of PL feature (B < 45 Tesla)

G.027 – Mortimer – Band gaps shifts observed especially for B $\perp$ to tube axis and attributed to dark exciton effects

G.026 – Mortimer – T dependence of PL indicates dark-light exciton splitting in 1-5 meV range

G.041 – Pimenta – Excitonic effects discussed for Raman and PL, noting unusual excitonic behavior for E_{33} and E_{44} transitions.

G.035 – Malic – Chirality dependence of optical absorption is calculated with analytic solutions given for zigzag tubes

G.028 – Jiang – Calculated excitonic effects shown to be heavily chirality dependent, stemming from trigonal warping effect

G.029 – Park – Resonance window is strongly chirality dependent, and comparison between theory and experiment shows that resonance window for metallic tubes is larger than for S tubes.

G.024 – Harigaya – Excitonic effects in BN nanotubes are calculated and compared to SWNTs.

Magnetic Phenomena – 5 (2)

G.055 – Enoki – Unusual spin magnetism at graphene and nanographite edges are reviewed with emphasis given to singularities in electronic states for zigzag edges

G.054 – Shaver – Anisotropic magnetic susceptibility allows SWNT alignment in high magnetic fields (up to 58 Tesla). Optical studies yield dynamics of spin alignment, tube length distribution, bundling effects.

G.053 – Kitaura – Various magnetic properties of magnetic metallofullerenes inside carbon nanotubes

G.052 – Hayashi, magnetic properties of a Co nanorod encapsulated MWNT are studied

G.051 – Yang – Theoretical investigation of interplay between structure and magnetism for a nanowire which can stretch by up to 20% with small energy cost.

G.038, G.027 – High magnetic fields used to break symmetry to study dark excitons.

Non-Linear Optics - 3

G.032 – Byeon – Strong third harmonic generation is observed for freely suspended SWNTs

G.047 – Ferrari – Carbon nanotube composites in polymer films and solutions are used for saturable absorbers, with promising performance for spectral tunability and for passive mode-locking of ultrafast lasers

G.044 – Shimamoto – Non-linear transmission and reflection of SWNTs are measured using Z-scan technique

Characterization Tools - 3

G.045 – Vieira – Properties of SWNTs functionalized by COOH and C-H derivatives and modified by cutting to short lengths are characterized by various optical and chemical techniques.

G.046 – Jeong – The concentration of SWNTs and thin MWNTs in a sample is found by optical absorption based on prior extinction coefficient determination.

G.057 – Matsubara – The effects of various plasma treatment to improve the mechanical properties of vapor grown carbon fibers are investigated using both optical absorption and photoluminescence and other characterization techniques.

Optical Applications

G.036 – Dericke – The optical switching of polymer-functionalized SWNTs when used as optical gate shows 4 orders of magnitude conductance change for dark and illuminated devices.

G.025 – Maksimenko – Radiation pattern for carbon nanotube arrays is calculated for device applications

G.050 – Gorjizadeh – Electron-phonon coupling is calculated with regard to effects observed in electron transport at high bias voltage in devices.

G.059 – Britz – The performance is demonstrated for a transparent conductor based on a SWNT network with a broad range of tunability for the conductivity and transparency

G.058 – Sasaki – The graphite/C_{60}/graphite sandwich system is investigated theoretically to understand the mechanism for superlubricity observed experimentally.

G.030, G.057, G.032, G.047, G.045, G.031 – Research leading to applications

G.041, G.055 – related to nanographene

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G.001 – Murata – Biosensor specific to pig serum albumin

G.015 – Hunt – Biosensor CNTs and Si Nanowire molecular sensors

G.022 – Song – Biosensor of glycines on SWNTs binding to alcohols

G.009 – Seo – Toxic gas sensor better than ppm (SO_2, NO_2)

G.023 – Lee – Flow rate sensor – single SWNT detection (detects increasing flow rate inducing higher voltage)

Secondary sensor applications G.052 (magnetic)
G.016 (physical property)

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G.007 – Suzuki – mechanism was studied for electron irradiation caused band bending, creation of energy barriers, defects, metal-semiconducting transitions

G.012 – Li – uni-polar n-type semiconducting behavior found from Fe filling of core. Can make ferromagnetic semiconductor SWNTs

G.013 – Li – uni-polar n-type semiconducting behavior found from Cs filling or core. Shows Coulomb blockade.

G.014 – Shishido – Filled core with Co, Li, Na, K, KCl, CsI. Alkali metals make n-type SWNTs from pristine p-type SWNTs. Made p-n junction from Cs (donor), I (acceptor) 20nm quantum dots

G.008 – Suzuki – One drop of APTES solution used for charge transfer to convert p-type to n-type devices.

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G.002 – Wei – CNT-FET can operate either n-type or p-type with tunability

G.004 – Vijayaraghavam – model to explain hysteresis in gate modulated FET

G.019 – Bethoux – FET operation up to 8GHz demonstrated

G.005 – Umesaka – } Surface potential of CN-FET, where electrodes are different metals is measured by Kelvin probe microscopy

G.021 – Miyato –

G.006 – Maki – Electrodes of two different metals are used to inject electrons and holes at the same time utilizing difference in working functions.

G.010 – Ohnaka – Grid inserted PECVD is used to achieve growth of 90% S/SWNT by electrical breakdown of M/SWNT

G.017 – Lee – Achieved unipolar FETs by controlling double layer configuration of catalyst during SWNTs growth.

G.018 – Wu – Achieved negative differential conductance and hysteresis-free transport for SWNTs suspended from the tips of vertically aligned nanofibers.

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G.011 – Rinkio – Memory element achieved by placing charge trap at a controlled distance from SWNT.

G.016 – Sakurai – Non-volatile memory controlled by spontaneous polarization in ferroelectric film used as a gate of CNT-FET

G.003 – Lee – One quantum dot is used as a gate to manipulate transport in another quantum dot.

G.020 – Shah – Dependence of I-V characteristics on temperature and tip-SWNT overlap area.

G.049 – Hsu – Calculation of reflectance and transmission coefficients for transport in a molecular device.

Future directions

Photophysics

- **Increase photoluminescence efficiency**
- **Clarify excitonic behavior for metallic tubes and higher E_{ii} semiconducting levels**
- **Establish behavior of dark exciton states**
- **New Techniques**
  - **NSOM**
  - **Rayleigh**
  - **Aberration corrected TEM imaging**

General Goals

- **Control synthesis specific (*n,m*) tubes and their placement**
- **Achieve large scale nanotube production, with high quality, low cost**
- **Promote scientific discovery, device concept innovation, and nanotube-based product development**
- **Interaction of carbon nanotube research with related non-carbon nanotubes, nanowires and other nano-structures**