

安藤 恒也

学歴

- 1968年3月 東京大学 理学部 物理学科 卒業
1970年3月 東京大学 大学院 理学系研究科 物理学専門課程 修士課程 修了
1973年3月 東京大学 大学院 理学系研究科 物理学専門課程 博士課程 修了 (理学博士)

職歴

- 1973年4月 東京大学 理学部 助手
1975年2月～1975年12月 ミュンヘン工科大学 客員研究員
1976年1月～1976年12月 フンボルト研究員 (ミュンヘン工科大学)
1977年9月～1978年9月 米国 IBM Thomas J. Watson 研究所 客員研究員
1979年1月 筑波大学 物理工学系 助教授
1983年7月 東京大学 物性研究所 助教授
1990年1月 東京大学 物性研究所 教授
2002年4月 東京工業大学 大学院理工学研究科 物性物理学専攻 教授
2006年6月 東京大学名誉教授
2011年3月 東京工業大学 名誉教授
2011年4月 東京工業大学 理工学研究科 物性物理学専攻 特命教授
2011年7月 東京工業大学 栄誉教授
2012年4月～2014年3月 日本物理学会 JPSJ 編集委員長・理事
2016年4月 東京工業大学 研究員
2017年9月 大韓民国 成均館大学 ナノ技術研究所 名誉所長
2018年4月 公益財団法人 豊田理化学研究所 客員フェロー

個人情報

安藤恒也

所属学会

日本物理学会

応用物理学会

American Physical Society (Fellow)

受賞等

1982年 仁科記念賞 (MOS反転層における二次元電子系の理論的研究)

1983年 学士院賞 (強磁場下のMOS反転層における伝導現象の理論)

1995年 Würzburg大学名誉博士 - レントゲンによるX線発見百周年 (半導体物理学, 特に強磁場下二次元電子系の理論)

1999年 日本物理学会論文賞 [H. Ajiki and T. Ando, Electronic states of carbon nanotubes, J. Phys. Soc. Jpn. **62**, 1255 (1993)]

2000年 ISI World's Most Cited and Influential Scientific Authors in Physics

2006年 江崎玲於奈賞 (量子ナノ構造の電子物性理論の先駆的研究)

2008年 American Physical Society Outstanding Referee

2010年 Paper of Editors' Choice, Journal of Physical Society of Japan [A. Toyoda and T. Ando, Theory of electron scattering by lattice defects in monolayer graphene, J. Phys. Soc. Jpn. **79**, 094708 (2010)]

2011年 日本物理学会論文賞 [T. Ando, Screening effect and impurity scattering in monolayer graphene, J. Phys. Soc. Jpn. **75**, 074716 (2006)]

2015年 Paper of Editors' Choice, Journal of Physical Society of Japan [T. Ando, Theory of valley Hall conductivity in graphene with gap, J. Phys. Soc. Jpn. **84**, 114705 (2015)]

その他

1994-1996年度 文部科学省科学研究費重点領域研究「量子位相エレクトロニクス」領域代表

2003-2007年度 東京工業大学21世紀COEプログラム「量子ナノ物理学」拠点リーダー

研究成果: これまでの研究

安藤恒也

量子ナノ構造の輸送現象と光学現象に現れる量子効果と多体効果を中心に研究を行い、量子ナノ構造の電子物性の理論的解明と理論的予言によりこの分野に寄与してきた。以下にこれまでの研究成果をまとめる。

[1] 量子ホール効果とシリコン表面反転層

大学院生時代に開始した強磁場下2次元電子系の量子輸送現象の理論的研究[1-3]は、シリコン表面反転層における量子ホール効果発見へつながった。その後、反転層のサブバンド構造に対する電子間相互作用効果、光吸収スペクトル[4]など多くの理論的研究へと発展した。この関連する論文がいくつか日本物理学会編の論文選集「シリコンMOS反転層II」に採録された。また、論文[3]は日本物理学会欧文誌のホームページでJPSJ Highlightsとして11編の論文の一つに挙げられている。また、この2次元電子系の研究をまとめた総合報告を執筆した[5]。この論文は1988年にCitation Classicsに選ばれ、米国物理学会誌Physics Todayの記事[S. Redner, Citation Statistics from 110 Years of Physical Review, Physics Today 2005年6月号49頁]でも1000件以上引用されている論文11編の一つとして紹介された。

[2] 低次元系の局在問題

その後、量子ホール効果と密接に関係した強磁場下2次元電子系の局在・非局在転移[6]と局在長の臨界指数の決定[7, 8]、対角伝導度とホール伝導度の普遍的な関係などについて研究を行った。局在効果では対称性が重要な役割を果たす。スピン軌道相互作用の強い場合には2次元系でも金属絶縁体転移が存在することを始めて理論的に予言した[9]。その際に導入した格子模型は、現在発展の著しいスピントロニクスに関する理論的研究に多用されている。

[3] 半導体ヘテロ構造・量子井戸・超格子

表面反転層の研究はその後実現した半導体ヘテロ構造2次元電子系、超格子、量子井戸におけるサブバンド構造、光吸収、光散乱、電気伝導などの研究へと発展させた[10-12]。さらに、ヘテロ界面における電子波の接続を記述する界面行列の提案と具体的な計算と応用[13]、量子井戸励起子[14]、超格子における格子振動と電子格子相互作用などの理論的研究を行った[15]。このいくつかが日本物理学会編の論文選集「半導体ヘテロ接合超格子」に採録された。

[4] メソスコピック系における量子輸送現象

半導体ナノ構造の典型である量子細線における局在効果、普遍コンダクタンスゆらぎ、境界凹凸散乱の効果などについて理論的研究を行った[16]。量子細線における端電流に起因する量子ホール効果と、熱力学的極限でのバルク電流による量子ホール効果の間のクロスオーバーが、非弾性散乱による位相コヒーレンス長と系の大きさの関係で起きることを始めて示した。さらに、人工格子であるアンチドット格子における電気伝導、特にそこでの古典カオスと量子カオスの役割、その結果現れるさまざまな磁気振動現象の理論的解明を行った[17]。これらの研究で、グリーン関数を用いた格子模型による磁場中のコンダクタンスの数値計算の手法を開発したが[18]、その後、この手法は頻繁に使われるものとなった。境界凹凸散乱の研究は論文選集「メソスコピック系」に取り上げられた。関連する研究で、平成6-8年度重点領域研究「量子位相エレクトロニクス」の領域代表を務めた。

[5] カーボンナノチューブの電気伝導と光学現象

研究は1991年の発見直後に開始した。その目標は、出発点となる2次元グラファイト上での電子の運動が質量ゼロのニュートリノと同一であることに着目し、それに基づき電子構造と物性

を統一的な形式で記述し、ナノチューブの興味深いさまざまな性質を理論的に予言することであった。予言の正しさは最近の実験で確かめられつつある。例えば、軸方向の磁場によるカーボンナノチューブの電子構造へのアハラノフ - ボーム効果 [19, 20] は、10年後の実験で実際に観測された。さらに、金属ナノチューブでは散乱体があるにもかかわらず、後方散乱が抑制され、抵抗のない完全伝導性を示すことを示した [21–23]。このおどろくべき性質は最近のさまざまな実験で確かめられ始めている。この研究は格子振動の効果へと発展した [24]。ナノチューブの光学的性質について、電子間相互作用が半導体ナノチューブのバンドギャップを大きく増大させること、さらに伝導帯に励起された電子と価電子帯のホールの束縛状態である励起子の束縛エネルギーがバンドギャップの1/3程度と大きく、ほぼ励起子でのみで吸収・発光が起こることを理論的に示した [25]。その正しさは最近の実験的研究で確かめられている。

この研究に関連して、1994年バンクーバーの第22回半導体物理学国際会議で共著者の安食博志氏(当時大学院生)がYoung Author Best Paper Awardを受賞し、1999年に第4回日本物理学会論文賞を受賞した。さらに、1999年日本物理学会54回年会での特別講演、2002年エジンバラの半導体物理学国際会議や2003年ドレスデンのドイツ物理学会での基調講演、2002年の第23回低温物理学国際会議、2003年の第15回2次元電子物性国際会議での招待講演、2009年日本物理学会でのレビュー講演を含め、国際会議の基調講演や招待講演を行い、招待論文 [26] を出版した。

[6] グラフェンの特異な電気伝導現象

ナノチューブと密接に関連したグラフェンの電子物性の特異性に着目し、その電気伝導 [27]、量子ホール効果 [28]、光学伝導率、伝導度の量子補正 [29] について理論的研究を行ってきた。グラフェンの電気伝導が測定可能になり、量子ホール効果が実際に観測され、この分野の研究が大きく発展したが、これらの理論的予言が実際に確かめられた [30, 31]。数多くの関連国際会議が開催され、そこで基調講演や招待講演を行った。特に2010年ソウルの半導体物理学国際会議で、グラフェンを作製しノーベル賞を受賞した Geim と基調講演を行った。また、2016年に日本物理学会で総合講演を行った。最近では、2018年モンペリエでの半導体物理学国際会議で再度 Geim と基調講演を行った。現在、このグラフェンの示す更なる不思議な現象の理論的解明と予言を目指した研究を行っている。

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- [3] Theory of Hall-effect in a two-dimensional electron-system, T. Ando, Y. Matsumoto, and Y. Uemura, *J. Phys. Soc. Jpn.* **39**, 279–288 (1975).
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- [6] Effect of localization on the Hall conductivity in the two-dimensional system in strong magnetic fields, H. Aoki and T. Ando, *Solid State Commun.* **38**, 1079–1082 (1981).
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- [18] Quantum point contacts in magnetic fields, T. Ando, Phys. Rev. B **44**, 8017–8027 (1991).
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- [20] Magnetic-properties of carbon nanotubes, H. Ajiki and T. Ando, J. Phys. Soc. Jpn. **62**, 2470–2480 (1993).
- [21] Impurity scattering in carbon nanotubes - Absence of back scattering, T. Ando and T. Nakanishi, J. Phys. Soc. Jpn. **67**, 1704–1713 (1998).
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Publication List

Tsuneya ANDO

1. Original Articles

1. Screening effects in a disordered electron system. I. General consideration of dielectric function
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2. Screening effects in a disordered electron system. II. Application to the impurity band
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3. Variational calculation of acceptor states in tellurium
K. Natori, T. Ando, M. Tsukada, K. Nakao, and Y. Uemura, *J. Phys. Soc. Jpn.* **30**, 1197–1197 (1971). DOI: 10.1143/JPSJ.30.1197
4. Transverse magneto-conductivity of a two-dimensional electron gas^[1]
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7. Theory of quantum transport in a two-dimensional electron system under magnetic fields. I. Characteristics of level broadening and transport under strong magnetic fields^[2]
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^[19] Selected as one of Papers of Editors' Choice

402. Zero-mode anomalies of massless Dirac electron in graphene
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403. Singular orbital magnetism of graphene
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427. Theory of magnetic response in two-dimensional giant Rashba system
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428. Boundary conditions at closed edge of bilayer graphene and energy bands of collapsed nanotubes
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430. Note on formula of weak-field Hall conductivity: Singular behavior for long-range scatterers
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431. Effects of electron-hole asymmetry on magnetic response in graphene
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432. Magnetic susceptibility of collapsed carbon nanotubes
T. Ando, *J. Phys. Soc. Jpn.* **86**, 024704-1–10 (2017). DOI: 10.7566/JPSJ.86.024704
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[20] Selected as one of Papers of Editors' Choice

- T. Ando, *J. Phys. Soc. Jpn.* **86**, 064709-1–9 (2017). DOI: 10.7566/JPSJ.86.064709
434. Valley Hall conductivity in graphene: Effects of higher-order scattering
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2. Book Chapters

1. Introduction
T. Ando: *Mesoscopic Physics and Electronics*, edited by T. Ando, Y. Arakawa, K. Furuya, S. Komiyama, and H. Nakashima (Springer, Berlin, 1998), pp. 1–2.
2. Length scales characterizing mesoscopic systems
T. Ando: *Mesoscopic Physics and Electronics*, edited by T. Ando, Y. Arakawa, K. Furuya, S. Komiyama, and H. Nakashima (Springer, Berlin, 1998), pp. 3–10.
3. Landauer’s formula
T. Ando: *Mesoscopic Physics and Electronics*, edited by T. Ando, Y. Arakawa, K. Furuya, S. Komiyama, and H. Nakashima (Springer, Berlin, 1998), pp. 11–14
4. Antidot lattices – Classical and quantum chaos
T. Ando: *Mesoscopic Physics and Electronics*, edited by T. Ando, Y. Arakawa, K. Furuya, S. Komiyama, and H. Nakashima (Springer, Berlin, 1998), pp. 72–89
5. Crossover from quantum to classical regime
T. Ando: *Mesoscopic Physics and Electronics*, edited by T. Ando, Y. Arakawa, K. Furuya, S. Komiyama, and H. Nakashima (Springer, Berlin, 1998), pp. 109–119.
6. Theory of Electronic States and Transport in Graphene
T. Ando: *Physics and Chemistry of Graphene*, edited by T. Enoki and T. Ando (Pan Stanford, Singapore, 2013), pp. 9–87.

3. Invited Talks at International Conferences (since 1995)

1. Edge and bulk Landau states in the quantum-Hall regime (Invited)
T. Ando, *International Symposium on Heterostructures in Science and Technology, Würzburg, Germany, March 13 – 17, 1995.*
2. Effective-mass approximation at heterointerfaces: Intervalley mixing and interface fluctuations (Invited)
T. Ando, *22nd International Symposium on Compound Semiconductors, Cheju Island, Korea, Aug. 28 – Sep. 2, 1995.*
3. Interaction effects on cyclotron resonance in high magnetic fields (Invited)
T. Ando, *Adriatico Research Conference on the Electron Quantum Liquid in Systems of Reduced Dimensions, ICTP, Trieste, July 2 – 5, 1996.*
4. Mesoscopic transport in low dimensional systems (Plenary Invited)
T. Ando, *23rd International Conference on Physics of Semiconductors, Berlin, Germany, July 21 – 26, 1996.*
5. Carbon nanotubes in magnetic fields (Invited)
T. Ando and H. Ajiki, *International Conference on Application of High Magnetic Fields in Semiconductor Physics, Würzburg, Germany, July 28 – Aug. 2, 1996.*
6. Quantum transport in mesoscopic semiconductor structures (Invited)
T. Ando, *11th Nishinomiya Yukawa Memorial Symposium on Physics in 21st Century, Nishinomiya, Japan, November 7–8, 1996.*
7. Quantum transport in antidot lattices (Invited)
T. Ando, *Advanced Heterostructure Workshop, Hawaii, USA, December 1–6, 1996.*

8. Chaos and quantum transport in antidot lattices (Invited)
T. Ando, *1998 2nd International Symposium on Formation, Physics, and Device Application of Quantum Dot Structures, Sapporo, Japan, May 31 – June 4, 1998.*
9. Theory of quantum transport in mesoscopic systems – Antidot lattices – (Invited)
T. Ando, *International Workshop on Physics and Applications of Semiconductor Quantum Structures (1998 Asian Science Seminar), Cheju Island, Korea, October 18 – 23, 1998.*
10. Mesoscopic transport in antidot lattices: Roles of quantum effects and chaos (Invited)
T. Ando, *International Workshop on Nanophysics and Electronics, Lecce, Italy, November 23 – 25, 1998.*
11. Quantum transport in carbon nanotubes (Invited)
T. Ando, *International Symposium on Fullerenes and Nanotubes, Yuya-Onsen, Aichi, Japan, June 3 – June 6, 1999*
12. Quantum transport in carbon nanotubes (Invited Report)
T. Ando, *22nd International Conference on Low Temperature Physics, Helsinki, Finland, August 4 – 11, 1999*
13. Quantum chaotic transport in mesoscopic antidot arrays (Invited)
T. Ando and S. Uryu, *196th Meeting of the Electrochemical Society (1999 Joint International Meeting), Hawaii, U.S.A., October 17 – 22, 1999*
14. Electronic and transport properties of carbon nanotubes (Invited)
T. Ando, *Workshop on Quantum Transport and Mesoscopic Physics, National Chiao Tung University, Hsinchu, Taiwan, January 6 – 8, 2000*
15. Theory of quantum transport in carbon nanotubes (Invited)
T. Ando, *International Winterschool on Electronic Properties of Novel Materials, Kirchberg, Austria, March 4 – 11, 2000*
16. Electronic and transport properties of carbon nanotubes (Invited Panelist)
T. Ando, *2000 International Conference on Solid State Devices and Materials, Sendai, Japan, August 29 – 31, 2000*
17. Interaction effects on two-component cyclotron resonance in quantum Hall regimes (Invited)
T. Ando, *International Symposium on Semiconductor Physics and Devices, Osaka, Japan, July 6, 2001.*
18. Electronic states and transport in carbon nanotubes (Invited)
T. Ando, *International Workshop and Seminar on Nano-Physics & Bio-Electronics – A New Odyssey, Max-Planck Institut für Physik komplexer Systeme, Dresden, Germany, August 6 – 31, 2001.*
19. Theory of electric conduction in carbon nanotubes (Invited)
T. Ando, *Tsukuba Symposium on Carbon Nanotube, Tsukuba, Japan, October 3 – 5, 2001.*
20. Interaction effects on two-component cyclotron resonance in the quantum Hall regime (Invited)
T. Ando and K. Asano, *International Symposium on Quantum Hall Effect and Heterostructures (to commemorate the 100th anniversary of the first Physics Nobel Prize), Würzburg, Germany, December 11 – 15, 2001.*
21. Carbon nanotubes as a phase-coherent quantum cylinder (Invited)
T. Ando, *International Workshop on Quantum Phase at the Nanoscale, Ettore Majorana Center, Erice, Italy, July 15 – July 20, 2002.*
22. Theory of electronic states and transport in carbon nanotubes (Plenary)

- T. Ando, 26th International Conference on the Physics of Semiconductors, Edinburgh, UK, July 19 – August 2, 2002.
23. Transport in nanotubes and nanostructures (Invited)
T. Ando and H. Suzuura, 23rd International Conference on Low-Temperature Physics, Hiroshima, Japan, August 20 – August 27, 2002
 24. What is interesting now and future in microscopic carrier transport? (Plenary)
T. Ando, 2002 International Conference on Simulation of Semiconductor Processes and Devices, International Conference Center Kobe, Kobe, Japan, September 4 – 6, 2002
 25. Theory of carbon nanotubes (Invited)
T. Ando, 9th Hamburg Symposium on the Physics of Micro- and Nanostructures, Haus Rissen, Hamburg, Germany, October 7 – 9, 2002.
 26. Exotic electronic properties of carbon nanotubes (Invited)
T. Ando, UK-Japan Nanotechnology Symposium – Recent Progress and Future Challenge –, Hotel Floracion Aoyama, Tokyo, Japan, November 5, 2002.
 27. Theory of ballistic transport in carbon nanotubes (Invited)
T. Ando, 2002 Advanced Heterostructure Workshop, Hapuna Beach Prince Hotel, Hawaii, USA, December 1 – 6, 2002.
 28. Physics of carbon nanotubes (Plenary)
T. Ando, German Physical Society Spring Meeting of the Division Condensed Matter Physics, March 24 – 28, 2003.
 29. Quantum transport in carbon nanotubes (Plenary)
T. Ando, Nanostructures: Physics and Technology (11th International Symposium), St Petersburg, Russia, June 23 – 28, 2003.
 30. Crossover between quantum and classical transport: Quantum Hall effect and carbon nanotubes (Invited)
T. Ando, International Symposium on Quantum Hall Effect: Past, Present, and Future, Stuttgart, Germany, July 2 – 5, 2003.
 31. Interaction effects on electronic states in carbon nanotubes (Invited)
T. Ando, USA-Japan Workshop on the Frontiers of Nanoscale Science and Technology, Tokyo, Japan, July 10 – 12, 2003.
 32. Role of electron spin in integer quantum Hall photoluminescence (Invited)
T. Ando and K. Asano, International Symposium on Physics in High Magnetic Fields, Tokyo, Japan, July 12, 2003.
 33. Carbon nanotubes and exotic transport properties (Invited)
T. Ando, 15th International Conference on Electronic Properties of Two-Dimensional Systems, Nara, Japan, July 14 – 18, 2003.
 34. Carbon nanotubes and unique transport properties (Invited)
T. Ando, International Symposium on Electronic Properties of Two-Dimensional Systems: History and Recent Developments, IBM Thomas J. Watson Research Center, USA, November 10 – 11, 2003.
 35. Theory of electronic states and optical absorption in carbon nanotubes (Invited Keynote Lecture)
T. Ando, Optoelectronics 2004, Physics and Simulation of Optoelectronic Devices XII, San Jose, California, USA, January 26 – 29, 2004.
 36. Fano effects in an Aharonov-Bohm ring with a quantum dot (Invited)
T. Ando, Japan-UK 10+10 Meeting on Nanophysics and Nanoelectronics, Clarendon Laboratory, University of Oxford, UK, March 12 – 13, 2004

37. Exotic transport properties of carbon nanotubes (Invited)
T. Ando, 205th Meeting of the Electrochemical Society, M5 – Nanotubes and DNA's: Novel Materials and Molecular Devices, San Antonio, USA, May 9 – 14, 2004.
38. Fano interference effects in an Aharonov-Bohm ring with a quantum dot (Invited)
T. Ando, 31st International Symposium on Compound Semiconductors, Seoul National University, Seoul, Korea, September 12 – 16, 2004.
39. Exotic transport properties of carbon nanotubes (Invited)
T. Ando, NAREGI Workshop on Electronic Transport, Excitation and Correlation in Nanoscience, Hokkaido University, Sapporo, October 4 – 8, 2004.
40. Electronic states and optical properties of carbon nanotubes (Lecture, 90 min)
T. Ando, 2nd NTT-BRL School in Fuji, Fuji Seminar House, Japan, October 8 – 14, 2004.
41. Exotic transport properties of carbon nanotubes (Lecture, 90 min)
T. Ando, 2nd NTT-BRL School in Fuji, Fuji Seminar House, Japan, October 8 – 14, 2004.
42. Theory of excitons and optical absorption in carbon nanotubes (Invited, 30 min)
T. Ando, 11th Advanced Heterostructure Workshop, Hapuna Beach Prince Hotel, Hawaii, USA, December 5 – 10, 2004.
43. Physics of carbon nanotube (Invited, 45 min)
T. Ando, The 3rd International Symposium on Nanotechnology, Tokyo Big Sight, Tokyo, Japan, February 21 – 22, 2005.
44. Carbon nanotube photo-physics (Invited, 30 min)
T. Ando, UK-Japan Nanotechnology Symposium – Physics, IT Devices, and Biology –, Toranomon Pastoral, Tokyo, Japan, March 9, 2005.
45. Theory of electronic and optical properties of carbon nanotubes (Invited, 25 min)
T. Ando, 2005 (7th) Sweden-Japan Workshop on Quantum Nano-Physics and Electronics, Campus Plaza, Kyoto, Japan, April 7 – 8, 2005
46. Theory of the Aharonov-Bohm effect in carbon nanotubes (Invited, 30 min)
T. Ando, 12th International Conference on Narrow Gap Semiconductors, Toulouse, France, July 3 – 7, 2005.
47. Excitons and Aharonov-Bohm effect in carbon nanotubes (Invited, 45 min)
T. Ando, International Workshop on Nanotube Optics and Nanospectroscopy, Mountain Village Conference Center Telluride, USA, July 17 – 20, 2005.
48. Carbon nanotubes and unique transport properties (Invited, 35 min)
T. Ando, 8th International Symposium on Foundations of Quantum Mechanics in the Light of New Technology, Hitachi Advanced Research Laboratory, Japan, August 22 – 25, 2005.
49. Zero-field spin splitting in two-dimensional systems (Invited, 30 min)
T. Ando, International Workshop on Spin and Quantum Transport, International Frontier Center for Advanced Materials, Tohoku University, Sendai, Japan, October 12 – 14, 2005.
50. Carbon nanotube as a zero resistance quantum wire (Invited, 30 min)
T. Ando, International Symposium on Quantum Dots and Nanoelectronics, Tokyo Garden Palace, Tokyo, Japan, November 18, 2005.
51. Aharonov-Bohm effect on excitons in carbon nanotubes (Invited, 30 min)
T. Ando, 2nd Korea-Japan Symposium on Carbon Nanotube, Hotel Taikansou, Matsushima, Japan, November 27 – 30, 2005.
52. Exotic transport properties of carbon nanotubes (Invited, 30 min)

T. Ando, Nano-Science and Quantum Physics, University of California, Berkeley and Tokyo Institute of Technology Interdepartment Symposium, Berkeley, USA, January 5 – 6, 2006.

53. Exotic transport properties of two-dimensional graphite (Invited, 30 min)
T. Ando, International Conference on Nanoelectronics 2006, Lancaster University, UK, January 8 – 11, 2006.
54. Metallic nanotubes as a perfect conductor (Invited, 30 min)
T. Ando, Seventh International Conference on the Science and Application of Nanotubes (NT06), Hotel Metropolitan Nagano, Nagano, Japan, June 18 – 23, 2006.
55. Theory of quantum transport in two-dimensional graphite (Invited, 30 min)
T. Ando, 17th International Conference on High Magnetic Fields in Semiconductor Physics, Würzburg, Germany, July 30 – August 4, 2006.
56. Quantum Hall effect in graphene (Invited, 30 min)
M. Koshino and T. Ando, 17th International Conference on High Magnetic Fields in Semiconductor Physics, Würzburg, Germany, July 30 – August 4, 2006.
57. Theory of quantum transport in carbon nanotubes (Keynote Lecture, 30 min)
T. Ando, TNT2006 “Trends in Nanotechnology”, MINATEC, Grenoble, France, September 4 – 8, 2006.
58. Quantum anomalies in graphene and nanotube (Invited, 30 min)
T. Ando, 12th Advanced Heterostructure Workshop, Hapuna Beach Prince Hotel, Hawaii, USA, December 3 – 8, 2006.
59. Exotic electronic properties of graphene and nanotube (Invited, 30 min)
T. Ando, 2nd International Symposium on Nanometer Scale Quantum Physics, Tokyo Institute of Technology, Tokyo, Japan, January 24 – 26, 2007.
60. Theory of quantum transport in graphene and nanotubes (Invited, 80 min)
T. Ando, Graphene Workshop at Lorentz Center, University of Leiden, Leiden, The Netherlands, February 5 – 9, 2007.
61. Theory of quantum transport in graphene and nanotubes (Invited, 36 min)
T. Ando, 2007 APS March Meeting, Denver, Colorado, USA, March 5 – 9, 2007.
62. Physics of graphene and nanotube (Invited, 40 min)
T. Ando, 2007 Frontiers in Nanoscale Science and Technology Workshop, University of Tokyo, Tokyo, Japan, March 29 – 31, 2007.
63. Quantum transport in carbon nanotubes: Absence of backscattering, drude tail, and inter-wall conductance (Invited, 45 min)
T. Ando, Discussion meeting on carbon-based electronics: Fundamentals and device applications, The Royal Society, London, UK, May 21 – 22, 2007.
64. Quantum anomalies in graphene (Invited, 45 min)
T. Ando, 2007 Canadian Association of Physicists Congress, University of Saskatchewan, Saskatoon, Canada, June 17 – 20, 2007.
65. Orbital magnetism in graphenes (Invited, 30 min)
M. Koshino and T. Ando, 13th International Conference on Narrow Gap Semiconductors, University of Surrey, UK, July 8 – 12, 2007.
66. Theory of quantum transport in graphene and nanotubes (Invited, 90 min)
T. Ando, International School on Magnetic Fields for Science, Cargese, Corsica, France, August 27 – September 8, 2007.
67. Exotic transport properties of graphene and nanotube (Invited, 45 min)
T. Ando, Yukawa International Seminar 2007 on Interaction and Nanostructural Effects in Low-Dimensional Systems, Kyoto, November 5 – 30, 2007.

68. Exotic electronic and transport properties of graphene (Invited, 40 min)
T. Ando, 5th International Winterschool on New Developments in Solid State Physics (Mauterndorf 2008), Kur and Kongresszentrum, Bad Hofgastein, Austria, February 18 – 22, 2008.
69. Emerging physics in graphene and carbon nanotubes (Invited, 60 min)
T. Ando, First HOPE Meeting on Nanoscience and Nanotechnology, Epochal Tsukuba, Ibaraki, Japan, February 24 – 28, 2008
70. Graphene and emerging physics (Keynote Lecture, 60 min)
T. Ando, 4th International Nanotechnology Conference on Communication and Cooperation, Tokyo, Japan, April 14 – 17, 2008
71. Physics of carbon nanotube and graphene: (1) Electronic states in carbon nanotubes, (2) Quantum transport in carbon nanotubes, (3) Quantum transport in graphene (Lecture, each 90 min)
T. Ando, International Spring School on “Sub-10 nm Wires,” Institute for Solid State Physics, University of Tokyo, Kashiwa, Japan, May 28 – 30, 2008
72. Excitons and Aharonov-Bohm effect in carbon nanotubes (Plenary, 40 min)
T. Ando, 8th International Conference on Excitonic Processes in Condensed Matter, Kyoto, Japan, June 22 – 27, 2008
73. Physics of graphene and its multi-layer (Invited, 35 min)
T. Ando, 9th International Symposium on Foundations of Quantum Mechanics in the Light of New Technology, Advanced Research Laboratory, Hitach Ltd., August 25 – 28, 2008
74. Theory of quantum transport in graphene and nanotubes (Invited, 50 min)
T. Ando, ICTP Conference Graphene Week 2008, Trieste, Italy, August 25 – 29, 2008
75. Physics of graphene: Zero-mode anomaly, symmetry crossover, and electron-phonon interaction (Plenary, 75 min)
T. Ando, Graphene Canada 2008, Banff Centre for Conferences, Banff, Canada, September 14 – 19, 2008
76. Electronic states and transport in graphene and nanotube (Invited, 50 min)
T. Ando, ITRS Emerging Research Devices Workshops: Carbon-Based Nanoelectronics, Tsukuba International Congress Center, September 22, 2008
77. Electron transport in graphene mono and multi-layers (Plenary, 60 min)
T. Ando, The 4th Vacuum and Surface Sciences Conference of Asia and Australia (VASSCAA-4), Kunibiki Messe, Matsue, Japan, October 28 – 31, 2008
78. Physics of graphene (Plenary, 45 min)
T. Ando, The 2008 Asian Conference on Nanoscience and Nanotechnology (Asia-NANO2008), Biopolis, Singapore, November 3 – 7, 2008
79. Electronic structures and properties of multilayer graphenes (Invited, 30 min)
M. Koshino and T. Ando, The 2008 Asian Conference on Nanoscience and Nanotechnology (AsiaNANO2008), Biopolis, Singapore, November 3 – 7, 2008
80. Exotic electronic properties of graphene and its multi-layers (Invited, 30 min)
T. Ando, 5th International Symposium on Surface Science and Nanotechnology (ISSS-5), International Conference Center, Waseda University, Tokyo, Japan, November 9 – 13, 2008
81. Theory of graphene and its multi-layers (Invited, 30 min)
T. Ando, International Symposium on Graphene Devices: Tchnology, Physics, and Modeling (ISGD2008), University of Aizu, Aizu-Wakamatsu, Japan, November 17 – 19, 2008

82. Electronic and transport properties of graphene: Theory based on continuum models I (Invited, 75 min)
T. Ando, 18th Workshop on Nanoscale and Mesoscopic Systems: Graphene Physics, POSTECH, Korea, December 5 – 6, 2008
83. Electronic and transport properties of graphene: Theory based on continuum models II (Invited, 75 min)
T. Ando, 18th Workshop on Nanoscale and Mesoscopic Systems: Graphene Physics, POSTECH, Korea, December 5 – 6, 2008
84. Physics of graphene and its multilayers: Zero-mode anomalies, symmetry crossover, and electron-phonon interaction (Invited, 30 min)
T. Ando, Okazaki Conference 2009 – From Aromatic Molecules to Graphene: Chemistry, Physics and Device Applications, Okazaki Conference Center, Okazaki, Japan, February 21 – 23, 2009
85. Theory of excitons in carbon nanotube (Invited, 40 min)
T. Ando and S. Uryu, International Symposium on Nanoscience and Quantum Physics, International House of Japan, Tokyo, February 23 – 25, 2009
86. Excitons and Aharonov-Bohm effect in carbon nanotubes (Invited, 20 min)
T. Ando, 215th ECS Meeting, Symposium H4 – Carbon Nanotubes and Nanostructures: Applications and Devices, Hilton San Francisco, USA, May 24 – 29, 2009
87. Optical properties of monolayer and bilayer graphene (Invited, 35 min)
T. Ando, M. Koshino, and K. Asano, 3rd Workshop on Nanotube Optics and Nanospectroscopy, Matsushima, Japan, June 7 – 10, 2009
88. Dynamical properties of mono- and bi-layer graphene (Invited, 40 min)
T. Ando, M. Koshino, and K. Asano, International Workshop on Recent Progress in Graphene Research, Korea Institute for Advanced Study, Seoul, Korea, June 29 – July 2, 2009
89. Graphene in magnetic fields: Singular diamagnetic response and interaction effects on cyclotron resonance (Invited, 25 min)
T. Ando, M. Koshino, Y. Arimura, and K. Asano, Graphene Tokyo 2009, University of Tokyo, Japan, July 25 – 26, 2009
90. Electron-phonon interaction and field effects on phonons in graphene and nanotube (Invited, 30 min)
T. Ando, 16th International Conference on Electron Dynamics in Semiconductors, Optoelectronics, and Nanostructures (EDISON16), Montpellier, France, August 24 – 28, 2009
91. Physics of graphene and its multilayers: From zero-mode anomalies to band-gap opening (Invited, 30 min)
T. Ando, Canada-Poland-Japan International Symposium on Semiconductor, Magnetic, and Photonic Nanostructures, Wroclaw, Poland, October 4 – 8, 2009
92. Pseudo-spin physics in graphene (Invited, 30 min)
T. Ando, Symposium on Spin Manipulation in Solid State Systems, Würzburg, Germany, October 8 – 9, 2009
93. Theory of graphene and carbon nanotubes (Invited, 30 min)
T. Ando, G-COE PICE International Symposium on Silicon Nano Devices in 2030, Tokyo Institute of Technology, Japan, October 13 – 14, 2009
94. Physics of graphene and its multilayers: From zero-mode anomalies to band-gap opening (Invited, 40 min)
T. Ando, India-Japan Conference on Graphene, Conference Hall, JNCASR, Bangalore, India, November 17 – 19, 2009

95. One-dimensional characters of excitons in carbon nanotubes (Invited, 30 min)
S. Uryu and T. Ando, SPIE Photonic West 2010 – Quantum Sensing and Nanophotonic Devices VII, San Francisco, USA, January 23 – 28, 2010
96. Field effect on phonons in graphene (Invited, 40 min)
T. Ando, Graphene Week 2010, College Park, Maryland, USA, April 19 – 23, 2010
97. Theory of monolayer and bilayer graphene: Pseudo-spin physics (plenary, 45 min)
T. Ando, 30th International Conference on the Physics of Semiconductors, COEX, Seoul, Korea, July 25 – 30, 2010
98. Zero-mode anomalies in graphene: Recent advances (Invited, 20 min)
T. Ando, ECI Conference on Recent Advances in Graphene and Related Materials, Singapore, August 1 – 6, 2010
99. Roles of pseudo-spin in electronic and transport properties of graphene (Invited, 30 min)
T. Ando, Frontiers in Nanoscale Science and Technology Workshop 2011 (FNST 2011), RIKEN Wako Campus, Wako, Saitama, Japan, January 5 – 7, 2011
100. Peculiar electronic and transport properties of graphene (Invited, 30 min)
T. Ando, International Workshop on Dielectric Thin Films for Future ULSI Devices: Science and Technology, Tokyo Institute of Technology, Tokyo, Japan, January 20 – 21, 2011
101. Exotic transport properties of graphene: Recent developments (Invited, 40 min)
T. Ando, International Symposium on Nanoscience and Quantum Physics, International House of Japan, Tokyo, Japan, January 26 – 28, 2011
102. Zero-mode anomalies in graphene revisited (Invited, 35 min)
T. Ando, UK-Japan Graphene Workshop, Lancaster University, UK, February 3 – 4, 2011
103. Chiral electrons and zero-mode anomalies in graphene (Invited, 60 min)
T. Ando, Topical Research Meeting on Physics: Graphene and Related Two-Dimensional Materials, Institute of Physics, London, UK, June 1 – 2, 2011.
104. Exotic transport properties of chiral electrons in graphene (Invited, 20 min)
T. Ando, 10th QNANO Meeting, Clarion Hotel Wisby, Visby, Sweden, June 13 – 14, 2011.
105. Physics of chiral electrons in graphenes (Invited, 60 min)
T. Ando, The 15th International Symposium on the Physics of Semiconductors and Applications, Ramada Plaza Jeju Hotel, Cheju, Korea, July 5 – 8, 2011.
106. Exotic transport properties of monolayer and bilayer graphene (Invited, 40 min)
T. Ando, International Conference Advanced Carbon Nanotstructures, St Petersburg, Russia, July 4 – 8, 2011.
107. Graphene and its fascinating physics (Invited, 40 min)
T. Ando, Millennium Science Forum 2011, British Embassy, Tokyo, November 9, 2011.
108. Physics of chiral electrons in graphene (Invited, 45 min)
T. Ando, 26th Nishinomiya-Yukawa Memorial International Workshop “Novel Quantum States in Condensed Matter 2011 (NQS2011)”, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, Japan, November 7 – December 9, 2011.
109. Excitons in carbon nanotubes: Effects of dielectric environment and inter-wall interaction (Invited, 25 min)
T. Ando, S. Uryu, Y. Tomio, and H. Suzuura, Workshop on Carbon Nanotube in Commemoration of the 20th Anniversary of Its Discovery (2011-CNT20), The International House of Japan, Tokyo, December 12 – 13, 2011.

110. Theory of chiral electrons in graphene (Oral, 30 min)
T. Ando, JSPS-DST Workshop on Graphene and Related Materials, Tokyo Institute of Technology, Tokyo, Japan, February 29 – March 2, 2012.
111. Theory of Dirac electrons in graphene (Plenary, 45 min)
T. Ando, 2012 MRS Spring Meeting, Moscone West, San Francisco, April 9 – 13, 2012.
112. Theory of chiral electrons in graphene and nanotubes (Invited, 40 min)
T. Ando, International Symposium on Nanoscience and Quantum Physics, The International House of Japan, Tokyo, December 17 – 19, 2012.
113. Theory of environment effects on excitons in carbon nanotubes (Invited, 30 min)
T. Ando, S. Uryu, Y. Tomio, and H. Suzuura, 5th Workshop on Nanotube Optics and Nanospectroscopy (WONTON2013), Santa Fe, NM, USA, June 16 – 22, 2013.
114. Theory of Dirac electrons in graphene and nanotube (Invited, 35 min)
T. Ando, Symposium on Quantum Hall Effects and Related Topics, Max Planck Institut für Festkörperforschung, Stuttgart, Germany, June 26 – 28, 2013.
115. Theory of Dirac electrons in graphene: Minimum conductivity and weak-field Hall effect (Invited, 30 min)
T. Ando, The 12th Asia Pacific Physics Conference of AAPPS, Makuhari, Japan, July 14 – 19, 2013.
116. Electrons in graphene: From diamagnetism to transport (Invited, 25 min)
T. Ando, The 5th International Conference on Recent Progress in Graphene Research (RPGR2013), Tokyo Tech Front, Tokyo, Japan, September 10 (Tue) – 13 (Fri) 2013.
117. Exotic phenomena caused by chiral electrons in graphene (Invited, 30 min)
T. Ando, The AIMR International Symposium 2014 (AMIS2014), Sendai International Center, Japan, February 17 (Mon) – 19 (Wed) 2014.
118. Quantum transport in carbon nanotubes (Invited lecture, 45 min)
T. Ando, The 2nd von Klitzing Lecture, Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China, June 18 (Wed) 2014.
119. Exitons in carbon nanotubes (Invited lecture, 45 min)
T. Ando, The 2nd von Klitzing Lecture, Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China, June 18 (Wed) 2014.
120. Magnetic response and phonon anomaly in graphene (Invited lecture, 45 min)
T. Ando, The 2nd von Klitzing Lecture, Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China, June 18 (Wed) 2014.
121. Exotic transport properties of graphene (Invited lecture, 45 min)
T. Ando, The 2nd von Klitzing Lecture, Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China, June 18 (Wed) 2014.
122. Theory of topological Hall effect in graphene with gap (Invited, 20 min)
T. Ando, Symposium “Recent Advances in Semiconductor Nanostructures,” Salle Jean Jaurés, Ecole Normale Supérieure, Paris, France, April 3 (Fri) 2015.
123. Physics of graphene and related materials (Invited, 50 min)
T. Ando, International Symposium on Present and Future of Material Sciences, Sigma Hall, Osaka University, Osaka, Japan, November 17 (Tue) – 18 (Wed), 2015.
124. Theory of topological phenomena in graphene and related materials (Invited, 30 min)
T. Ando, ENS-UT Workshop on Physics 2015, University of Tokyo, Tokyo, Japan, November 18 (Wed) – 19 (Thu), 2015.
125. Topological transport phenomena in graphene and related materials (Invited, 40 min)

T. Ando, 2015 International Symposium on Advanced Nanodevices and Nanotechnology (ISANN 2015), Waikoloa, Hawaii, USA, November 29 (Sun) – December 4 (Fri), 2015.

126. Effective-mass description of electronic states in carbon nanotubes: From absence of backscattering to collapsed structure (Invited, 30 min)
T. Ando, International Symposium on Carbon Nanotube in Commemoration of its Quarter-Century Anniversary (CNT25), Tokyo, Japan, November 16 (Tue) – 18 (Fri), 2016.
127. Exotic topological phenomena in graphene (Plenary, 30 min)
T. Ando, First SAINT-BK21Plus International Workshop, Del Pino (Daemyung Resort), Korea, October 19 (Thu) – 21 (Sat), 2017.
128. Topological phenomena and anomaly in graphene (Invited, 35 min)
T. Ando, International Symposium on Quantum Hall Effects and Related Topics, Max Planck Institute for Solid State Research, Stuttgart, Germany, June 27 (Wed) – 29 (Fri), 2018.
129. Exotic topological phenomena in graphene and related materials (Plenary, 45 min)
T. Ando, The 34th International Conference on the Physics of Semiconductors, Corum Conference Center, Montpellier, France, July 29 (Sun) – August 3 (Fri), 2018.