

# 略 歴 等

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昭和 45 年 3 月 都立西高等学校卒業  
昭和 45 年 4 月 東京大学理科 I 類入学  
昭和 50 年 3 月 東京大学教養学部基礎科学科卒業  
昭和 50 年 4 月 東京大学大学院理学系研究科相関理化学専攻修士課程入学  
昭和 52 年 3 月 東京大学大学院理学系研究科相関理化学専攻修士課程修了  
昭和 52 年 4 月 日本電信電話株式会社入社  
昭和 59 年 2 月 同社基礎研究所主任研究員  
昭和 62 年 3 月 東京大学より理学博士の学位を授与さる  
博士論文題名：InAs 表面反転層の超伝導近接効果と  
その電界による制御に関する研究  
昭和 63 年 7 月 カルフォルニア大学バークリー校物理学科客員研究員 (1 ヶ年)  
平成 3 年 7 月 NTT 基礎研究所 超伝導量子物理研究グループリーダー  
平成 8 年 7 月 デルフト工科大学(オランダ)客員教授 (3 ヶ月)  
平成 7 年 東京理科連携大学院教授  
平成 9 年 6 月 チャルマース工科大学(スウェーデン)客員教授 (2 ヶ月)  
平成 10 年 7 月 NTT 物性科学基礎研究所 物質科学研究部部長 グループリーダー兼務  
平成 10 年 12 月 デンマーク工科大学客員教授 (1 カ月)  
平成 12 年 5 月 NTT R&D フェロー  
平成 14 年 5 月 ランカスター大学客員教授 (1 ヶ月)  
平成 15 年 3 月 中国南京大学客員教授(H18 年まで)  
平成 15 年 4 月 東京大学客員教授 (H18.3 まで)  
平成 15 年 7 月 NTT 物性科学基礎研究所長 NTT 理事  
平成 15 年 8 月 王立工科大学 (ストックホルム) 客員教授 (1 ヶ月)  
平成 15 年 10 月 東北大学客員教授 (H16.3 まで)  
平成 16 年 4 月 北海道大学客員教授 (H18.3 まで)  
平成 16 年 8 月 プリンストン大学 Visiting Senior Research Scientist (1 ヶ月)  
平成 17 年 7 月 地中海大学理論物理研究所 (フランス) 客員教授 (1 ヶ月)  
平成 18 年 4 月 東京理科大学 応用物理学科 教授  
平成 19 年 10 月 (独) 物質・材料研究機構 国際ナノアーキテクトニクス研究拠点

主任研究員（理科大兼務）（平成 27 年 3 月まで）  
 平成 20 年 4 月 東京理科大学 理事（研究担当）（平成 23 年 4 月まで）  
 平成 22 年 7 月 中国南京大学客員教授（平成 25 年 6 月まで）  
 平成 27 年 4 月 東京理科大学 研究推進機構 総合研究院 教授  
 平成 28 年 4 月 熊本大学 客員教授  
 平成 30 年 4 月 東京理科大学 特任副学長 研究推進機構 総合研究院院長  
 令和 3 年 4 月 東京大学大学院新領域創成科学研究科 特任教授（兼務）

受賞・称号 昭和 61 年 電電公社研究開発本部長表彰  
 平成 6 年 NTT 基礎研究所所長表彰  
 平成 8 年 NTT 基礎研究所所長表彰  
 平成 12 年 第 7 回日産科学賞受賞  
 平成 15 年 6 月 第 7 回超伝導科学技術賞受賞  
 平成 16 年 7 月 HONORARY PROFESSOR（台湾、交通大学）  
 平成 16 年 12 月 Foreign Member of The Royal Society of Sciences and Letters in Gothenburg  
 (Sweden)

委員等 平成 9 年より 11 年まで NEDO 国際共同研究助成事業研究代表  
 Satellite conference to LT22 (Electron Transport in Mesoscopic Systems  
 スウェーデン 1999) 組織委員,  
 第 10 回狭ギャップ半導体国際会議(金沢, May 2001)組織委員、  
 Superconducting Device Physics 2001（東京、June 2001）組織委員  
 第 23 回低温物理国際会議（広島, August 2002）組織委員  
 第 15 回 2 次元電子系の性質国際会議 EP2DS（2003, August 奈良）組織委員  
 Int. Conf. on Solid State Devices and Materials 2004 (2004, September 東京) 組織委員  
 Int. Conf. on Solid State Devices and Materials 2005（2005, September 兵庫）組織委員  
 Int. Microprocess and Nanotechnology Conf. 2004 (2004, October 大阪)組織委員  
 Int. Microprocess and Nanotechnology Conf. 2005 (2005, October 大阪)組織委員  
 Int. Symp. on Mesoscopic Superconductivity MS2000（NTT 厚木, 2000）及び  
 Int. Symp. on Mesoscopic Superconductivity and Spintronics MS+S2002（NTT 厚木, 2002）及び  
 Int. Symp. on Mesoscopic Superconductivity and Spintronics MS+S2004（NTT 厚木, 2004）及び  
 Int. Symp. on Mesoscopic Superconductivity and Spintronics MS+S2006（NTT 厚木, 2006）  
 の議長を務める  
 平成 12 年より ERATO 樽茶多体相関場プロジェクト研究推進委員（平成 16 年まで）  
 平成 12 年より NEDO 国際共同研究助成事業研究員（平成 14 年まで）  
 平成 13 年より東京大学工学研究科量子相エレクトロニクスセンター・アジャクトメンバー  
 平成 14 年度 大学評価機構大学評価委員会評価員  
 平成 15 年度より 日本学術会議・基礎物理定数小委員会委員  
 平成 15 年度より 日本学術会議・AMO 小委員会委員  
 平成 15 年度より NEDO 技術委員（国際共同研究助成事業審査委員）  
 平成 14 年度より CREST 研究代表（超伝導量子ビット、H19 年度まで）  
 平成 14 年度より CREST 研究員（スピントロニクス、研究代表：新田淳作、平成 19 年度まで）

平成 15 年度より 筑波大学ナノサイエンス特別プロジェクト客員研究員 [平成 19 年 3 月まで]  
 平成 15 年度より CREST 研究員 (アトムチップ、研究代表：清水富士夫、平成 20 年度まで)  
 平成 15 年度より Advisory Board Member of Nanodev Center in Chalmers Univ. (Sweden)  
 平成 16 年度より CREST 研究員 (超放射コヒーレント光、研究代表：花村榮一、平成 17 年度まで)  
 平成 17 年度より CREST 研究員 (超伝導フォトニクス創成とその応用、研究代表：末宗幾夫、平成 22 年度まで)  
 平成 15 年より 財団法人神奈川科学アカデミー理事 (平成 18 年 3 月まで)  
 平成 15 年より 社団法人研究産業協会理事 (平成 18 年 3 月まで)  
 平成 15 年度より NICT 委託研究「量子もつれ光子対通信技術の研究開発」研究代表 (平成 17 年度まで)  
 平成 16 年度より 総務省「戦略的情報通信研究開発推進制度(SCOPE)」評価委員  
 平成 16 年度 文部科学省 21 世紀 COE プログラム 専門委員  
 平成 18 年度より JST さきがけ 領域アドバイザー  
 2007 年 日本国際賞分野検討委員会委員  
 平成 19 年度 文部科学省 グローバル COE プログラム 専門委員  
 平成 19 年度より CREST 研究員 (ナノギャップ電極/ナノ量子系接合による新機能の創出、研究代表：平川一彦、平成 24 年度まで)  
 平成 19 年度より [独] 産業技術総合研究所 研究顧問  
 平成 20 年度より 科学研究費基盤 S「究極のナノスクイッドの開発とデバイス展開」研究代表  
 平成 20 年度 日産科学賞選考委員  
 平成 22 年度より 総合科学技術会議最先端研究開発支援プログラム (first) 研究分担者 (量子情報システムの研究、研究代表：山本喜久 平成 26 年 3 月まで)  
 平成 22 年度より サー・マーティン・ウッド賞選考委員 (平成 26 年度まで)  
 平成 24 年度より 文部科学省 科学技術・学術審議会 専門委員 (平成 26 年度まで)  
 平成 25 年度より 理化学研究所 客員主幹研究員 (令和 2 年度まで)  
 平成 27 年度より 情報通信研究機構 外部評価委員  
 平成 27 年度より 文部科学大臣表彰審査委員 (若手科学者賞審査部会)

そのほか、東大、京大、東北大、東工大、名大、新潟大、青山学院大、北大、上智大の非常勤講師を務める

- 著作 1. B.J. van Wees and H. Takayanagi, "The superconducting proximity effect in semiconductor-superconductor systems", in *Mesoscopic Electron Transport* ed. by L.L. Sohn et al, (Kluwer, Dordrecht, 1997) p. 469.
2. 高柳英明「超伝導と常伝導の謎の境界」現代物理最前線 3 (共立出版、2000) .
3. *Towards the controllable quantum states*, ed. by H. Takayanagi and J. Nitta (World Scientific, Singapore, 2003)
4. 高柳英明「超伝導・常伝導のはざまにおかれたメゾスコピック系」メゾスコピック村のアリス、勝本信吾 編、丸善、2003
5. H. Tamura, H. Takayanagi and K. Shiraishi, "Quantum Dot Atoms, Molecules, and Superlattices", in *Quantum Dots and Nanowires* ed by S. Bandyopadhyay and H.S. Nalwa (American Scientific Pub. 2003) p. 67.

6. *Realizing Controllable Quantum States*, ed. by H. Takayanagi and J. Nitta  
(World Scientific, Singapore, 2005)
7. *Controllable Quantum States*, ed. By H. Takayanagi, J. Nitta and H. Nakano  
(World Scientific, Singapore, 2008)
8. 高柳英明「基礎からわかるナノデバイス」(オーム社、2011)

その他 1996年と1997年のノーベル・シンポジウムにオブザーバーとして招待される。  
1998年のノーベル賞授賞式に招待される  
2001年12月、ノーベル賞百周年シンポジウムで招待講演を行い、更に同年のノーベル賞授賞式に招待される。

## Publication List

高柳 英明

1. T. Aoki, Y. Endo, H. Takayanagi and K. Sakurai, "Photoelectron Statistics and Autocorrelation of a Mixer of Chaotic and Coherent Light of Same and Different Frequencies", *Phys. Rev. A* **13**, 853 (1976).
2. H. Takayanagi and T. Masumi, "A Broadband and Higher-Power Superconducting Quantum Magnetometer for the Small Signal A-D Converter", *Japan. J. Appl. Phys.*, **17**, 1117 (1978).
3. K. Nagata, S. Uehara, A. Matuda and H. Takayanagi, "Nb Based Te Barrier Josephson Junctions", *IEEE Trans., MAG-17*, 684 (1981).
4. K. Nagata, H. Takayanagi and S. Uehara, "mm-Wave Mixer with Nb-Te-Nb Josephson Junction", *J. Appl. Phys.*, **52**, 4852 (1981).
5. H. Takayanagi, K. Nagata and S. Uehara, "Nb-Te-Nb Josephson mm-Wave Mixer Characteristics and Analysis", *Japan. J. Appl. Phys.*, **21**, 848 (1982).
6. H. Takayanagi, S. Uehara and T. Kawakami, "Characteristics of Three-Dimensional Nb Weak Links", *Proc. Symp. Superconducting Quantum Electronics*, 84, (Tokyo, 1983).
7. H. Takayanagi and T. Kawakami, "Small Area Planar Nb/Nb Josephson Tunnel Junction with High Current Density", *Japan. J. Appl. Phys.*, **23**, L43 (1984).
8. T. Kawakami and H. Takayanagi, "Single-Crystal n-InAs Coupled Josephson Junction", *Appl. Phys. Lett.*, **46**, 92 (1985).
9. H. Takayanagi and T. Kawakami, "Planar-Type InAs-Coupled Three-Terminal Superconducting Devices", *Digest of Technical Papers of IEDM*, 98 (Washington D.C., 1985).
10. H. Takayanagi and T. Kawakami, "Superconducting Proximity Effect in the Native Inversion Layer on InAs", *Phys. Rev. Lett.*, **54**, 2449 (June, 1985).
11. H. Takayanagi, "Electric Field Effect on Superconductivity in an Inversion Layer Proximity System", *Proc. 2nd Inter. Symp. on Foundations of Quantum Mechanics* edited by M. Namiki et al. (The Physical Society of Japan, Tokyo, 1987) 241.
12. T. Kawakami, H. Takayanagi and K. Inoue, "InAs Coupled Superconducting Device", in *Superconductivity Electronics* (Prentice Hall, New Jersey, 1987) 285.
13. T. Kawakami and H. Takayanagi, "Proximity Effect in Bulk and Surface Inversion Layer of InAs and its Application to Superconducting Transistors", *Proc. Int. Conf. Low Temp. Phys.*, 2059 (LT-18, Kyoto, 1987).
14. N. Hatakenaka, S. Kurihara and H. Takayanagi, "Anomalous Current-Voltage Characteristics due to Macroscopic Resonant Tunneling in a Small Josephson Junction", *Phys. Rev. B* **42**, 3987 (1990).
15. N. Hatakenaka, H. Takayanagi and S. Kurihara, "Macroscopic Resonant Tunneling and Anomalous Current-Voltage Characteristics", *Proc. Int. Conf. Low Temp. Phys.*, LT-19, Brighton, 1990 (North-Holland, Amsterdam, 1990), 931.
16. H. Takayanagi, "Photon-Assisted Macroscopic Quantum Tunneling in a Small Josephson Junction", *Proc. Int. Conf. Low Temp. Phys.*, LT-19, Brighton, 1990 (North-Holland, Amsterdam, 1990), 959.
17. H. Takayanagi, K. Inoue and Y. Tanaka, "Local Tunneling Spectroscopy of the Quasiparticle

- in a Nb/InAs/Nb System", Proc. Int. Conf. Low Temp. Phys., LT- 19, Brighton, 1990 (North-Holland, Amsterdam, 1991), 467
18. K. Inoue and H. Takayanagi, "Local Tunneling Spectroscopy of an Nb/InAs/Nb Superconducting Proximity System with a Scanning Tunneling Microscope", Phys. Rev. B **43**, 6214 (1991).
  19. A. Furusaki, H. Takayanagi and M. Tsukada, "Theory of Quantum Conduction of Supercurrent through a Constriction", Phys. Rev. Lett. **67**, 132 (1991).
  20. A. Furusaki, H. Takayanagi and M. Tsukada, "Theory of Quantum Conduction of Supercurrent through Narrow Channels", in SQUID'91, edited by H. Koch and H. Lübig (Springer-Verlag, Heidelberg, 1991).
  21. J. Nitta, H. Nakano, T. Akazaki and H. Takayanagi, "Sub-Energygap Structures in a Nb/InAs/Nb Junction", in SQUID'91, edited by H. Koch and H. Lübig (Springer-Verlag, Heidelberg, 1991) 295.
  22. A. Furusaki, H. Takayanagi and M. Tsukada, "Josephson Current through Narrow Channels", in Proc. M2S-HTSC III (Kanazawa, 1991).
  23. T. Akazaki, J. Nitta and H. Takayanagi, "Single Crystal Growth of Nb Films onto MBE grown on (100)InAs", Appl. Phys. Lett. **59**, 2037 (1991).
  24. H. Nakano, T. Akazaki, J. Nitta and H. Takayanagi, "Thickness Dependence of Cooperon Lifetime in Quasi-Two Dimensional InAs Films", Solid State Commun. **80**, 251 (1991).
  25. H. Nakano and H. Takayanagi, "Quasiparticle Interferometer Controlled by Quantum-Correlated Andreev Reflection", Solid State Commun. **80**, 997 (1991).
  26. A. Furusaki, H. Takayanagi and M. Tsukada, "Josephson Effect of the Superconducting Quantum Point Contact", Phys. Rev. **B45**, 10563 (1992).
  27. H. Takayanagi, J. Nitta and T. Akazaki, "Transport in Semiconductor-Coupled Superconducting Structures", in Proc. 1st Int. Workshop on Quantum Functional Devices (Nasu, 1992) 110.
  28. H. Nakano and H. Takayanagi, "Modification of Quasiparticle Interference by Andreev-Reflection Phase Shifter", Proc.4th Inter. Symp. on Foundations of Quantum Mechanics ISQM edited by Namiki et al. (Japanese Society of Applied Physics, Tokyo, 1993) p.110.
  29. Y. Tanaka, A. Hasegawa and H. Takayanagi, "Microscopic Theory of Quasiparticle Energy Spectrum in a Quantum Dot formed by a Superconducting Pair Potential ", Proc.4th Inter. Symp. on Foundations of Quantum Mechanics ISQM edited by Namiki et al. (Japanese Society of Applied Physics, Tokyo, 1993) p.185.
  30. J.Nitta, T. Akazaki, H. Takayanagi and K. Arai, "Transport properties in InAs-inserted-channel InAlAs/InGaAs heterostructure coupled superconducting junction", Phys. Rev. B **46**, Rapid Commun. 14286 (1992).
  31. H. Takayanagi, T. Akazaki and J. Nitta, "Superconducting Structures on Narrow Gap Semiconductors", Semicond. Sci. Technol. **8**, S431 (1993).
  32. H. Nakano and H. Takayanagi, "Quasiparticle Interferometer controlled by Quantum-Correlated Andreev Reflection", Phys. Rev. B **47**, 7986 (1993).
  33. Y. Tanaka, A. Hasegawa and H. Takayanagi, "Energy Spectrum of the Quasiparticle in a Quantum Dot formed by a Superconducting Pair Potential under a Magnetic Field", Solid State, Commun., **85**, 321 (1993).
  34. Niko van der Post, J. Nitta and H. Takayanagi, "Elastic scattering and the current-voltage characteristics of superconducting Nb-InAs-Nb junctions", Appl.Phys. Lett., **63**, 2555 (1993).
  35. J. Nitta, T. Akazaki and H. Takayanagi, "Magnetic-field dependence of Andreev reflection in a

- clean Nb-InAs-Nb junction", Phys. Rev. B **49**, 3659 (1994).
36. H. Nakano and H. Takayanagi, "Second quantization description of Andreev reflection", Proc. Int. Conf Low Temp. Phys., LT-20, Eugene, 1993 (Physica B **194-196**, 1759 (1994)).
  37. Y. Tanaka, A. Hasegawa and H. Takayanagi, "Tunneling conductance of a quantum dot formed by a superconducting pair potential", Proc. Int. Conf. Low Temp. Phys., LT-20, Eugene, 1993 (Physica B **194-196**, 950 (1994)).
  38. J. Nitta, T. Akazaki and H. Takayanagi, Proc. Int. Conf. Low Temp. Phys., LT-20, Eugene, 1993 (Physica B **194-196**, 1757 (1994)).
  39. H. Nakano and H. Takayanagi, "Second-quantization description of Andreev reflection and the relation to quasiparticle wave approach", Phys. Rev. B **50**, 3139 (1994).
  40. T. Akazaki, J. Nitta, H. Takayanagi, T. Enoki and K. Arai, "Improving the mobility of an In<sub>0.52</sub>Al<sub>0.48</sub>As/In<sub>0.53</sub>Ga<sub>0.47</sub>As inverted modulation-doped structure by inserting a strained InAs quantum well", Appl. Phys. Lett., **65**, 1263 (1994).
  41. H. Takayanagi, T. Akazaki, J. Nitta and T. Enoki, "Superconducting Three Terminal Devices Using an InAs-Based Two-Dimensional Electron Gas", Extended Abst. 1994 Int. Conf. on Solid State Devices and Materials, 580 (SSDM'94, Yokohama, 1994).
  42. H. Takayanagi, J. B. Hansen and J. Nitta, "Mesoscopic fluctuations in the critical current in InAs-coupled Josephson junctions", Physica B **203**, 291 (1994).
  43. H. Takayanagi, J. B. Hansen and J. Nitta, "Localization effects on the critical current of a superconductor-normal-metal-superconductor junction", Phys. Rev. Lett. **74**, 162 (1995).
  44. H. Takayanagi, J. B. Hansen and J. Nitta, "Mesoscopic fluctuations of the critical current in a superconductor-normal-metal-superconductor junction", Phys. Rev. Lett. **74**, 166-169 (January, 1995).
  45. H. Takayanagi, T. Akazaki and J. Nitta, "Interference effects on the critical current in a clean-limit superconductor-normal-metal-superconductor junction", Phys. Rev B **51** Rapid Commun., 1374 (1995).
  46. H. Takayanagi, T. Akazaki, J. Nitta and T. Enoki, "Superconducting three-terminal devices using an InAs-based two-dimensional electron gas", Jpn. J. Appl. Phys. **34**, 1391 (1995).
  47. T. Akazaki, J. Nitta, H. Takayanagi, and K. Arai, "Superconducting Junctions using a 2DEG in a Strained InAs Quantum Well Inserted into an InAlAs/InGaAs MD Structure", Applied Superconductivity Conf. (Boston, 1994) (IEEE Trans. Appl. Supercon. **5**, 2887 (1995)).
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  49. Y. Harada and H. Takayanagi, "Coherent Cooper pair tunneling in a superconducting single electron transistor", International Workshop on Mesoscopic Physics and Electronics (Tokyo March 1995) (Jpn. J. Appl. Phys. **34**, 4572 (1995) ).
  50. Y. Tanaka and H. Takayanagi, "Energy spectrum of the quasiparticle in a quantum dot formed by a superconducting pair potential", International Workshop on Mesoscopic Physics and Electronics (Tokyo March 1995) (Jpn. J. Appl. Phys. **34**, 4566 (1995) ).
  51. H. Takayanagi and T. Akazaki, "Andreev reflection at the superconductor-two-dimensional -electron-gas interface by a quantum point contact", Phys. Rev. B **52** Rapid Commun., R8633 (1995).
  52. H. Takayanagi, "Semiconductor-coupled Josephson junction with a submicron split gate electrode", Second International Conference on Point Contact Spectroscopy (Nijmegen June

- 1995) (Physica B **218**, 113 1996).
53. H. Takayanagi, "Sub-micron gate-fitted superconducting junction using a 2DEG", The 8th International Micro-Process Conference (Sendai July 1995 ) (Jpn. J. Appl. Phys. **34**, 6977, 1995).
  54. H. Takayanagi, T. Akazaki and J. Nitta, "Observation of the quantized critical current in a superconducting quantum point contact", XIth International Conference on Electronic Properties of Two Dimensional Systems (Nottingham August 1995) (Surface Science, **361/362**, 298 (1996)).
  55. H. Takayanagi and H. Nakano, "Macroscopic Quantum Tunneling in a Superconductor-Normal Metal-Superconductor Junction", 5th International Symposium on Foundations of Quantum Mechanics (ISQM-Tokyo'95) (Hatoyama August 1995).
  56. H. Takayanagi, T. Akazaki and J. Nitta, "Observation of Maximum Supercurrent Quantization in a Superconducting Quantum Point Contact", Phys. Rev. Lett. **75**, 3533 (1995).
  57. H. Takayanagi and T. Akazaki, "Temperature dependence of the critical current in a clean-limit superconductor-2DEG-superconductor junction", Solid State Commun. **96**, 815 (1995).
  58. Takayanagi, "Andreev Reflection and Quantum Transport in an S-N-S Junction", Third International Symposium on New Phenomena in Mesoscopic Structures (Maui, December 1995 ) (Physica B **227**, 224 (1996)).
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