

# REFERENCES

- [1] Lavoisier AL. *Traité élémentaire de chimie*. Paris; 1789.
- [2] Novoselov KS, Geim AK, Morozov SV, Jiang D, Zhang Y, Dubonos SV, et al. Electric field effect in atomically thin carbon films. *Science* 004;306(5696):666–9.
- [3] Iijima S. Helical microtubules of graphitic carbon. *Nature* 1991;354(6348):56–8.
- [4] Kroto HW, Heath JR, O'Brien SC, Curl RF, Smalley RE. C<sub>60</sub> buckminsterfullerene. *Nature* 1985;318(6042):162–3.
- [5] K. S. Novoselov, et al., "Two-dimensional gas of massless Dirac fermions in graphene," *Nature*, vol. 438, pp. 197-200, 2005.
- [6] The Royal Swedish Academy of Sciences. (2010, October) The Nobel Prize in Physics 2010 – PressRelease. [Online]. [http://nobelprize.org/nobel\\_prizes/physics/laureates/2010/press.html](http://nobelprize.org/nobel_prizes/physics/laureates/2010/press.html)
- [7] Meyer, J. C.; Geim, A. K.; Katsnelson, M. I.; Novoselov, K. S.; Booth, T. J.; Roth, S. *Nature* 2007, 446, 60.
- [8] Geim, A. K.; Novoselov, K. S. *Nat. Mater.* 2007, 6, 183.
- [9] Katsnelson, M. I. *Mater. Today* 2006, 10, 20.
- [10] Novoselov, K. S.; McCann, E.; Morozov, S. V.; Fal'ko, V. I.; Katsnelson, M. I.; Zeitler, U.; Jiang, D.; Schedin, F.; Geim, A. K. *Nat. Phys.* 2006, 2, 177.
- [11] Jiang, Z.; Zhang, Y.; Tan, Y. W.; Stormer, H. L.; Kim, P. *Solid State Commun.* 2007, 143, 14.
- [12] Jiang, Z.; Zhang, Y.; Stormer, H. L.; Kim, P. *Phys. Rev. Lett.* 2007, 99, 106802.
- [13] Zhang, Y. B.; Tan, Y. W.; Stormer, H. L.; Kim, P. *Nature* 2005, 438, 201.
- [14] Novoselov, K. S.; Jiang, Z.; Zhang, Y.; Morozov, S. V.; Stormer, H. L.; Zeitler, U.; Maan, J. C.; Boebinger, G. S.; Kim, P.; Geim, A. K. *Science* 2007, 315, 1379.
- [15] Ozyilmaz, B.; Jarillo-Herrero, P.; Efetov, D.; Abanin, D. A.; Levitov, L. S.; Kim, P. *Phys. Rev. Lett.* 2007, 99, 186804.
- [16] Bolotin, K. I.; Sikes, K. J.; Jiang, Z.; Klima, M.; Fudenberg, G.; Hone, J.; Kim, P.; Stormer, H. L. *Solid State Commun.* 2008, 146, 351.
- [17] Novoselov, K. S.; Geim, A. K.; Morozov, S. V.; Jiang, D.; Katsnelson, M. I.; Grigorieva, I. V.; Dubonos, S. V.; Firsov, A. A. *Nature* 2005, 438, 197.
- [18] Morozov, S. V.; Novoselov, K. S.; Katsnelson, M. I.; Schedin, F.; Elias, D. C.; Jaszczak, J. A.; Geim, A. K. *Phys. Rev. Lett.* 2008, 100, 016602.
- [19] Han, M.; Ozyilmaz, B.; Zhang, Y.; Jarillo-Herero, P.; Kim, P. *Phys. Status Solidi B: Basic Solid State Phys.* 2007, 244, 4134.

- [20] Schedin, F.; Geim, A. K.; Morozov, S. V.; Hill, E. W.; Blake, P.; Katsnelson, M. I.; Novoselov, K. S. *Nat. Mater.* 2007, 6, 652.
- [21] Novoselov, K.; Geim, A. *Mater. Technol.* 2007, 22, 178–179.
- [22] Landau, L. D. *Phys. Z. Sowjetunion* 1937, 11, 26.
- [23] Peierls, R. E. *Ann. Inst. Henri Poincare* 1935, 5, 177., 76, 725.
- [24] K. Geim and K. S. Novoselov, "The rise of graphene," *Nature Materials*, vol. 6, pp. 183-191, March 2007.
- [25] K. I. Bolotin et al., "Ultrahigh electron mobility in suspended graphene," *Solid State Communications*, vol. 146, pp. 351-355, June 2008.
- [26] Jakub Kedzierski et al., "Epitaxial Graphene Transistors on SiC Substrates," *IEEE Transactions on Electron Devices*, vol. 55, pp. 2078-2085, August 2008.
- [27] Inanc Meric et al., "Current saturation in zero-bandgap, top-gated graphene field-effect transistors," *Nature Nanotechnology*, vol. 3, pp. 654-659, September 2008
- [28] Sensale-Rodriguez et al., "Broadband Graphene Terahertz Modulators," *Nature Communications*, accepted 2012.
- [29] L. Britnell et al., "Field-Effect Tunneling Transistor Based on Vertical Graphene Heterostructures," *Science*, vol. 335, pp. 947-950 , February 2012.
- [30] Radisavljevic, A. Radenovic, J. Brivio, V. Giacometti, and A. Kis, "Single-layer MoS<sub>2</sub> transistors," *Nature Nanotechnology*, vol. 6, pp. 147-150, January 2011.
- [31] Meyer JC, Kisielowski C, Erni R, Rossell MD, Crommie MF, Zettl A. Direct imaging of lattice atoms and topological defects in graphene membranes. *Nano Letters* 2008;8(11):3582–6.
- [32] Zhou SY, Gweon GH, Graf J, Fedorov AV, Spataru CD, Diehl RD, et al. First direct observation of Dirac fermions in graphite. *Nat Phys* 2006;2(9):595–9.
- [33] Calizo I, Balandin AA, Bao W, Miao F, Lau CN. Temperature dependence of the Raman spectra of graphene and graphene multilayers. *Nano Letters* 2007;7(9):2645–9.
- [34] Casiraghi C, Hartschuh A, Lidorikis E, Qian H, Harutyunyan H, Gokus T, et al. Rayleigh imaging of graphene and graphene layers. *Nano Letters* 2007;7(9):2711–7.
- [35] Dmitry K. Polyushkin, James Milton, Salvatore Santandrea, Saverio Russo, Monica F. Craciun, Stephen J. Green, Laureline Mahe, C. Peter Winlove and William L. Barnes. Submitted to *Journal of Optics*. (2012)
- [36] Di Bartolomeo, S. Santandrea, F. Giubileo, F. Romeo, M. Petrosino, R. Citro, P. Barbara, G. Lupina, T. Schroeder, A. Rubino Arxiv. (2012)
- [37] S. Santandrea, F. Giubileo, V. Grossi, M. Passacantando and A. Di Bartolomeo *Appl. Phys. Lett.* 98, 163109 (2011)

- [38] Antonio Di Bartolomeo, Filippo Giubileo, Salvatore Santandrea, Francesco Romeo, Roberta Citro, Thomas Schroeder, and Grzegorz Lupina Nanotechnology 22 (2011) 275702.
- [39] Kelly BT. Physics of graphite. London: Applied Science Publishers; 1981.
- [40] P. R. Wallace, "The Band Theory of Graphite," Physical Review, vol. 71, pp. 622-634, 1947.
- [41] Semenoff, G.W. Condensed-matter simulation of a three-dimensional anomaly. Phys. Rev. Lett. 53, 2449-2452 (1984).
- [42] Fradkin, E. Critical behavior of disordered degenerate semiconductors, Phys. Rev. B 33, 3263-3268 (1986).
- [43] Haldane, F. D. M. Model for a quantum Hall effect without Landau levels: Condensed-matter realization of the ‘parity anomaly’. Phys. Rev. Lett. 61, 2015-2018 (1988).
- [44] Schakel, A.M.J. Relativistic quantum Hall effect. Phys. Rev. D 43, 1428-1431 (1991).
- [45] González, J., Guinea, F., Vozmediano, M.A.H. Unconventional quasiparticle lifetime in graphite. Phys. Rev. Lett. 77, 3589-3592 (1996).
- [46] Gorbar, E.V., Gusynin, V.P., Miransky, V.A., Shovkovy, I.A. Magnetic field driven metal-insulator phase transition in planar systems. Phys. Rev. B 66, 045108 (2002).
- [47] Katsnelson, M.I. Zitterbewegung, chirality, and minimal conductivity in graphene. Eur. Phys. J. B 51, 157-160 (2006).
- [48] Katsnelson, M.I, Novoselov, K.S., Geim, A.K. Chiral tunnelling and the Klein paradox in graphene. Nat. Physics 2, 620-625 (2006).
- [49] Tworzydlo, J., Trauzettel, B., Titov, M., Rycerz, A. & Beenakker, C.W.J. Quantum-limited shot noise in graphene. Phys. Rev. Lett. 96, 246802 (2006).
- [50] A. K. Geim and K. S. Novoselov, "The rise of graphene," Nature Materials, vol. 6, pp. 183-191, March 2007.
- [51] Schedin, F. et al. Detection of individual gas molecules by graphene sensors (cond-mat/0610809).
- [52] Novoselov, K. S. et al. Electric field effect in atomically thin carbon films. Science 306, 666-669 (2004).
- [53] Novoselov, K. S. et al. Two-dimensional atomic crystals. Proc. Natl Acad. Sci. USA 102, 10451-10453 (2005).
- [54] Novoselov, K. S. et al. Two-dimensional gas of massless Dirac fermions in graphene. Nature 438, 197-200 (2005).
- [55] Aniruddha Konar, Tian Fang, and Debdeep Jena, "Effect of high-k gate dielectrics on charge transport in graphene-based field effect transistors," Physical Review B, vol. 82, p. 115452, September 2010.

- [56] Y.-W. Tan et al., "Measurement of Scattering Rate and Minimum Conductivity in Graphene," Physical Review Letters, vol. 99, p. 246803, December 2007.
- [57] Klitzing, K. v., Dorda, G. & Pepper, M. New method for high-accuracy determination of the fine-structure constant based on quantized hall resistance. *Phys. Rev. Lett.* **45**, 494–497 (1980).
- [58] Zhang, Y., *et al.*, *Nature* (2005) **438**, 201
- [59] Prange, R. E., and Girvin, S. M., (eds.), *The Quantum Hall Effect*, Springer, NY,
- [60] Esaki, L., *Phys. Rev.* (1958) **109**, 603
- [61] Katsnelson, M. I., *et al.*, *Nat. Phys.* (2006) **2**, 620
- [62] Milton Pereira, Jr., J., *et al.*, *Phys. Rev. B* (2006) **74**, 045424
- [63] Cheianov, V. V., and Fal'ko, V. I., *Phys. Rev. B* (2006) **74**, 041403(R)
- [64] Klein, O., *Z. Phys.* (1929) **53**, 157
- [65] Dombey, N., and Calogeracos, A., *Phys. Rep.* (1999) **315**, 41
- [66] Calogeracos, A., *Nat. Phys.* (2006) **2**, 579
- [67] A.C. Neto, F.Guinea, N.Perez, K Novoselov, and A.Geim, *Rev Mod . Phys.* 81, 109(2009)
- [68] X. Yan, X. Cui, B. Li, L. Li, Large, Solution-Processable Graphene Quantum Dots as Light Absorbers for Photovoltaics, *Nano Lett.*, 10 (2010), 1869
- [69] X. Wang, L. Zhi, K. Müllen, Transparent, Conductive Graphene Electrodes for Dye-Sensitized Solar Cells, *Nano Lett.*, 8, (2008), 323
- [70] F. Xia, T. Mueller†, Y. Lin, A. Valdes-Garcia, P. Avouris, Ultrafast graphene photodetector, *Nature Nanotechnology*, 4 (2009) 839
- [71] J. Wu, M. Agrawal, H. A. Becerril, Z. Bao, Z. Liu, Y. Chen, P. Peumans, Organic Light- Emitting Diodes on Solution-Processed Graphene Transparent Electrodes, *ACS Nano*, 4 (2010), 43
- [72] J. Wu, H. A. Becerril, Z. Bao, Z. Liu, Y. Chen, and P. Peumans, *Applied Physics Letters* 92, 263302 (2008).
- [73] X. Wang, L. Zhi, and K. Mullen, *Nano Letters* 8, 323 (2007).
- [74] P. Blake, P. D. Brimicombe, R. R. Nair, T. J. Booth, D. Jiang, F. Schedin, L. A. Ponomarenko, S. V. Morozov, H. F. Gleeson, E. W. Hill, *et al.*, *Nano Letters* 8, 1704 (2008).
- [75] M. D. Stoller, S. Park, Y. Zhu, J. An, and R. S. Ruoff, *Nano Letters* 8, 3498 (2008).
- [76] Y.W. Song, S.Y. Jang, W.S Han, M.K. Bae, Graphene mode-lockers for fiber lasers functioned with evanescent field interaction, *Appl. Phys. Lett.*, 96 (2010), 051122

- [77] Falkovsky, L. A. and Varlamov, A. A. (2007) Space-time dispersion of graphene conductivity. European Physical Journal B, **56**, 281–284.
- [78] Gusynin, V. P., Sharapov, S. G., and Carbotte, J. P. (2006) Unusual microwave response of dirac quasiparticles in graphene. Phys. Rev. Lett., **96**, 256802.
- [79] Nair, R. R., Blake, P., Grigorenko, A. N., Novoselov, K. S., Booth, T. J., Stauber, T., Peres, N. M. R., and Geim, A. K. (2008) Fine structure constant defines visual transparency of graphene. Science, **320**, 1308–1308.
- [80] Ruoff, R. Nat. Nanotech. 2008, 3, 10.
- [81] Morozov, S. V.; Novoselov, K. S.; Katsnelson, M. I.; Schedin, F.; Elias, D. C.; Jaszczak, J. A.; Geim, A. K. Phys. Rev. Lett. **2008**, *100*, 016602.
- [82] Castro, E. V.; Novoselov, K. S.; Morozov, S. V.; Peres, N. M. R.; Dos Santos, J. M. B. L.; Nilsson, J.; Guinea, F.; Geim, A. K.; Neto, A. H. C. Phys. Rev. Lett. 2007, *99*, 216802.
- [83] Meyer, J. C.; Geim, A. K.; Katsnelson, M. I.; Novoselov, K. S.; Obergfell, D.; Roth, S.; Girit, C.; Zettl, A. Solid State Commun. 2007, *143*, 101.
- [84] Yan, J.; Henriksen, E. A.; Kim, P.; Pinczuk, A. Phys. Rev. Lett. 2008, *101*, 136804.
- [85] Zhang YB, Small JP, Pontius WV, Kim P. Fabrication and electric-field-dependent transport measurements of mesoscopic graphite devices. Appl Phys Lett 2005;86(7):073104.
- [86] Blake P, Hill EW, Neto AHC, Novoselov KS, Jiang D, Yang R, et al. Making graphene visible. Appl Phys Lett 2007;91(6):063124.
- [87] Gao L, Ren W, Li F, Cheng H-M. Total color difference for rapid and accurate identification of graphene. ACS Nano 2008;2(8):1625–33.
- [88] Jung I, Pelton M, Piner R, Dikin DA, Stankovich S, Watcharotone S, et al. Simple approach for high-contrast optical imaging and characterization of graphene-based sheets. Nano Letters 2007;7(12):3569–75.
- [89] Chen J-H, Jang C, Xiao S, Ishigami M, Fuhrer MS. Intrinsic and extrinsic performance limits of graphene devices on SiO<sub>2</sub>. Nat Nano 2008;3(4):206–9.
- [90] Bolotin KI, Sikes KJ, Jiang Z, Klima M, Fudenberg G, Hone J, et al. Ultrahigh electron mobility in suspended graphene. Solid State Commun 2008;146(9–10):351–5.
- [91] Ishigami M, Chen JH, Cullen WG, Fuhrer MS, Williams ED. Atomic structure of graphene on SiO<sub>2</sub>. Nano Letters 2007;7(6):1643–8.
- [92] Moser J, Barreiro A, Bachtold A. Current-induced cleaning of graphene. Appl Phys Lett 2007;91(16):163513.
- [93] Keun Soo Kim et al., "Large-scale pattern growth of graphene films for stretchable transparent electrodes," *Nature*, vol. 457, pp. 706-710, February 2009.

- [94] Luxmi et al., "Temperature dependence of epitaxial graphene formation on SiC(0001)," *Journal of Electronic Materials*, vol. 38, pp. 718-724, October 2008.
- [95] Peter W. Sutter, Jan-Ingo Flege, and Eli A. Sutter, "Epitaxial graphene on ruthenium," *Nature Materials*, vol. 7, pp. 406 - 411, April 2008.
- [96] Xuesong Li et al., "Large-Area Synthesis of High-Quality and Uniform Graphene Films on Copper Foils," *Science*, vol. 324, pp. 1312-1314 , June 2009.
- [97] Emtsev K. et al, *Nat. Mater.* 8, 203-207 (2009)
- [98] Kurt Gaskill, Glenn Jernigan, Paul Campbell, and Joseph L. Tedesco, "Epitaxial Graphene Growth on SiC Wafers," *ECS Transactions*, vol. 19, pp. 117-124, May 2009.
- [99] Dan Li, Marc B. Müller, Scott Gilje, Richard B. Kaner, and Gordon G. Wallace, "Processable aqueous dispersions of graphene nanosheets," *Nature Nanotechnology*, vol. 3, p. 101, February 2007.
- [100] Dmitry V. Kosynkin et al., "Longitudinal unzipping of carbon nanotubes to form graphene nanoribbons," *Nature*, vol. 458, pp. 872-876, April 2009.
- [101] Liying Jiao, Li Zhang, Xinran Wang, Georgi Diankov, and Hongjie Dai, "Narrow graphene nanoribbons from carbon nanotubes," *Nature*, vol. 458, pp. 877-880, April 2009.
- [102] S. Fialkov, Carbon, carbon based intercalated compounds and composites (Published by Aspect Press, Russia, 1997).
- [103] D. S. L. Abergel, A. Russell, V. I. Fal'ko, *Appl. Phys. Lett.* 91, 063125 (2007).
- [104] P. Blake, et al., *Appl. Phys. Lett.* 91, 063124 (2007).
- [105] Blake P, Hill EW, Neto AHC, Novoselov KS, Jiang D, Yang R, et al. Making graphene visible. *Appl Phys Lett* 2007;91(6):063124.
- [106] Gao L, Ren W, Li F, Cheng H-M. Total color difference for rapid and accurate identification of graphene. *ACS Nano* 2008;2(8):1625–33.
- [107] Akcoltekin S, El Kharrazi M, Kohler B, Lorke A, Schleberger M. Graphene on insulating crystalline substrates *Nanotechnology* 2009;20(15):155601.
- [108] Jung I, Pelton M, Piner R, Dikin DA, Stankovich S, Watcharotone S, et al. Simple approach for high-contrast optical imaging and characterization of graphene-based sheets. *Nano Letters* 2007;7(12):3569–75.
- [109] Geim A K and MacDonald A H 2007 *Phys. Today* 60 35.
- [110] Henrie J, Kellis S, Shultz S M and Hawkins A 2004 *Opt. Expr.* 12 1464.
- [111] Jung I, Pelton M, Piner R, Dikin D A, Stankovich S, Watcharotone S, Hausner M and Ruoff RS 2007 *Nano Lett.* 7 3569.
- [112] Gao L, Ren W, Li F and Cheng H M 2008 *ACS Nano* 2 1625.
- [113] Dresselhaus MS, Dresselhaus G, Jorio A, Souza Filho AG, Pimenta MA, Saito R. Single nanotube Raman spectroscopy. *Accounts Chem Res* 2002;35(12):1070–8.

- [114] Ferrari AC, Meyer JC, Scardaci V, Casiraghi C, Lazzeri M, Mauri F, et al. Raman Spectrum of Graphene and Graphene Layers. *Phys Rev Lett* 2006;97(18):187401.
- [115] Ferrari AC. Raman spectroscopy of graphene and graphite: disorder, electron-phonon coupling, doping and nonadiabatic effects. *Solid State Commun* 2007;143(1–2):47–57.
- [116] Malard LM, Pimenta MA, Dresselhaus G, Dresselhaus MS. Raman spectroscopy in graphene. *Phys Rep* 2009;473(5–6):51–87.
- [117] Thomsen C, Reich S. Double resonant Raman scattering in graphite. *Phys Rev Lett* 2000;85(24):5214–7.
- [118] Ferrari AC, Robertson J. Resonant Raman spectroscopy of disordered, amorphous, and diamondlike carbon. *Phys Rev B* 2001;64(7):075414.
- [119] A.V. Baranov, A.N. Bekhterev, Y.S. Bobovich, V.I. Petrov, Opt. Spectrosk. 62 (1987) 1036.
- [120] C. Thomsen, S. Reich, Phys. Rev. Lett. 85 (2000) 5214.
- [121] R. Saito, A. Jorio, A.G. Souza Filho, G. Dresselhaus, M.S. Dresselhaus, M.A. Pimenta, Phys. Rev. Lett. 88 (2002) 027401.
- [122] R. Saito, A. Grüneis, Ge.G. Samsonidze, V.W. Brar, G. Dresselhaus, M.S. Dresselhaus, A. Jorio, L.G. Cançado, C. Fantini, M.A. Pimenta, A.G. Souza Filho, New J. Phys. 5 (2003) 157.1\_157.15.
- [123] Faugeras C, Nerriere A, Potemski M, Mahmood A, Dujardin E, Berger C, et al. Few-layer graphene on SiC, pyrolytic graphite, and graphene: a Raman scattering study. *Appl.Phys. Lett* 2008;92(1):011914.
- [124] Calizo I, Balandin AA, Bao W, Miao F, Lau CN. Temperature dependence of the Raman spectra of graphene and graphene multilayers. *Nano Letters* 2007;7(9):2645–9.
- [125] D. Graf, F. Molitor, K. Ensslin, C. Stampfer, A. Jungen, C. Hierold, and L. Wirtz, *Nano Letters* 7, 238 (2007).
- [126] A.H. Castro Neto, F. Guinea, N.M.R. Peres, K.S. Novoselov, A.K. Geim, *Rev. Modern Phys.* 81 (2009) 109\_161.
- [127] J.W. McClure, *Phys. Rev.* 108 (1957) 612.
- [128] J.C. Slonczewski, P.R. Weiss, *Phys. Rev.* 109 (1958) 272.
- [129] B. Partoens, F.M. Peeters, *Phys. Rev. B* 74 (2006) 075404.
- [130] I. Calizo, W. Bao, F. Miao, C. N. Lau, and A. A. Balandin, \The effect of substrates on the Raman spectrum of graphene: Graphene-on-sapphire and graphene-on-glass," *Appl Phys Lett*, vol. 91, p. 201904, Nov 2007.
- [131] D. Graf, F. Molitor, K. Ensslin, C. Stampfer, A. Jungen, C. Hierold, and L. Wirtz, \Raman imaging of graphene," *Solid State Communications*, vol. 143, pp. 44{46, Apr 2007.

- [132] D. Graf, F. Molitor, K. Ensslin, C. Stampfer, A. Jungen, C. Hierold, and L. Wirtz, "Spatially Resolved Raman Spectroscopy of Single- and Few-Layer Graphene," *Nano Lett.*, vol. 7, no. 2, pp. 238–242, 2007.
- [133] A. Das, S. Pisana, B. Chakraborty, S. Piscanec, S. K. Saha, U. V. Waghmare, K. S. Novoselov, H. R. Krishnamurthy, A. K. Geim, A. C. Ferrari, and A. K. Sood, "Monitoring dopants by Raman scattering in an electrochemically top-gated graphene transistor," *Nature Nanotech.*, vol. 3, pp. 210–215, Apr 2008.
- [134] C. Stampfer, F. Molitor, D. Graf, K. Ensslin, A. Jungen, C. Hierold, and L. Wirtz, "Raman imaging of doping domains in graphene on SiO<sub>2</sub>," *Appl Phys Lett.*, vol. 91, p. 241907, Jan 2007.
- [135] J. A. Robinson, C. P. Puls, N. E. Staley, J. P. Stitt, M. A. Fanton, K. V. Emtsev, T. Seyller, and Y. Liu, "Raman Topography and Strain Uniformity of Large-Area Epitaxial Graphene," *Nano Lett.*, vol. 9, no. 3, pp. 964–968, 2009.
- [136] T. Yu, Z. Ni, C. Du, Y. You, Y. Wang, and Z. Shen, "Raman mapping investigation of graphene on transparent flexible substrate: The strain effect," *J Phys Chem C*, vol. 112, pp. 12602–12605, July 2008.
- [137] Z. H. Ni, T. Yu, Y. H. Lu, Y. Y. Wang, Y. P. Feng, and Z. X. Shen, "Uniaxial Strain on Graphene: Raman Spectroscopy Study and Band-Gap Opening," *Acs Nano*, vol. 2, pp. 2301–2305, Oct 2008.
- [138] L.M. Malard, J. Nilsson, D.C. Elias, J.C. Brant, F. Plentz, E.S. Alves, A.H. Castro Neto, M.A. Pimenta, *Phys. Rev. B* 76 (2007) 201401
- [139] Ying ying Wang, Zhen hua Ni, Ting Yu, Ze Xiang Shen,, Hao min Wang, Yi hong Wu, Wei Chen, and Andrew Thye Shen Wee/ Raman Studies of Monolayer Graphene: The Substrate Effect, *J. Phys. Chem. C* 2008, 112, 10637–10640.
- [140] Anindya Das, Biswanath Chakraborty and A.K. Sood\_ Department of Physics, Indian Institute of Science, Bangalore - 560 012, India - arXiv:0710.4160v1 22 Oct 2007
- [141] Andrea Carlo Ferrari and John Robertson Raman spectroscopy of amorphous, nanostructured, diamond -like carbon, and nanodiamond, doi: 10.1098/rsta.2004.1452 *Phil. Trans. R. Soc. Lond. A* 2004 362, 2477-2512
- [142] V. P. Gusynin, S. G. Sharapov, J. P. Carbotte, International Journal of Mod. Phys. 21.
- [143] Novoselov KS, Jiang D, Schedin F, Booth TJ, Khotkevich VV, Morozov SV, et al. Two-dimensional atomic crystals. *Proc Nat Acad Sci USA* 2005;102(30):10451–3.
- [144] Zhang YB, Small JP, Amori MES, Kim P. Electric field modulation of galvanomagnetic properties of mesoscopic graphite. *Phys Rev Lett* 2005;94(17):176803.
- [145] Li L, Liu RP, Chen ZW, Wang Q, Ma MZ, Jing Q, et al. Tearing, folding and deformation of a carbon–carbon sp(2)-bonded network. *Carbon* 2006;44(8):1544–7.

- [146] Gupta A, Chen G, Joshi P, Tadigadapa S, Eklund. Raman scattering from high-frequency phonons in supported n graphene layer films. *Nano Letters* 2006;6(12):2667–73
- [147] Mermin, N. D., *Phys. Rev.* (1968) 176, 250
- [148] Novoselov, K. S., et al., *Proc. Natl. Acad. Sci. USA* (2005) 102, 10451
- [149] Born, M., and Huang, K., *Dynamical Theory of Crystal Lattices*, Oxford University Press, Oxford, UK (1998)8. Peierls, R. E., *Helv. Phys. Acta* (1934) 7, 81
- [150] Peierls, R. E., *Ann. Inst. H. Poincare* (1935) 5, 177
- [151] Landau, L. D., *Phys. Z. Sowjet Union* (1937) 11, 26
- [152] Nelson, D. R., et al., (eds.), *Statistical Mechanics of Membranes and Surfaces*, World Scientific, Singapore, (2004)
- [153] Nelson, D. R., and Peliti, L., *J. Physique* (1987) 48, 1085
- [154] Le Doussal, P., and Radzhovsky, L., *Phys. Rev. Lett.* (1992) 69, 1209
- [155] D. L. John, et al., "A Schrodinger-Poisson Solver for Modeling Carbon Nanotube FETs," *Proc. NSTINanotech*, vol. 3, pp. 65-68, 2004.
- [156] M. Pourfath, et al., "A fast and stable Poisson-Schrodinger solver for the analysis of carbon nanotube transistors," *Journal of Computational Electronics*, vol. 5, pp. 155-159, 2006.
- [157] G. Gu, et al., "Field effect in epitaxial graphene on a silicon carbide substrate," *Applied Physics Letters*, vol. 90, pp. 253507-3, 2007.
- [158] D. L. John, et al., "Quantum capacitance in nanoscale device modeling," *Journal of Applied Physics*, vol. 96, pp. 5180-5184, 2004.
- [159] M. M. Jose and S. Ashok, "Carrier density and effective mass calculations in carbon nanotubes," *physica status solidi (b)*, vol. 245, pp. 2558-2562, 2008.
- [160] G. Pennington and N. Goldsman, "Semiclassical transport and phonon scattering of electrons in semiconducting carbon nanotubes," *Physical Review B*, vol. 68, p. 045426, 2003.
- [161] R. Saito, et al., *Physical Properties of Carbon Nanotubes*. London: Imperial College Press, 1998.
- [162] J. Fernandez-Rossier, et al., "Electronic structure of gated graphene and graphene ribbons," *Physical Review B*, vol. 75, p. 205441, 2007.
- [163] A. Bostwick, et al., "Renormalization of graphene bands by many-body interactions," *Solid State Communications*, vol. 143, pp. 63-71, Jul 2007.
- [164] Kim, "Carbon Wonderland," *Scientific American Magazine*, vol. 298, pp. 90-97, 2008.
- [165] Gang Liu, Jairo Velasco, Wenzhong Bao, and Chun Ning Lau, "Fabrication of graphene p-n-p junctions with contactless top gates," *Applied Physics Letters*, vol. 92, p. 203103, May 2008.
- [166] Tian Fang, Aniruddha Konar, Huili Xing, and Debdeep Jena, "Mobility in semiconducting graphene nanoribbons: Phonon, impurity, and edge roughness scattering," *Physical Review B*, vol. 78, p. 205403, November 2008.

- [167] Tian Fang, Aniruddha Konar, Huili Xing, and Debdeep Jena, "Carrier statistics and quantum capacitance of graphene sheets and ribbons," *Applied Physics Letters*, vol. 91, p. 092109, August 2007.
- [168] Gong Gu et al., "Field effect in epitaxial graphene on a silicon carbide substrate," *Applied Physics Letters*, vol. 90, p. 253507, June 2007.
- [169] Christos Dimitrakopoulos et al., "Wafer-scale epitaxial graphene growth on the Si-face of hexagonal SiC (0001) for high frequency transistors," *Journal Vacuum Science Technology B*, vol. 28, pp. 985-992, September 2010.
- [170] V. Ryzhii, M. Ryzhii, A. Satou, and T. Otsuji, "Current-voltage characteristics of a graphene nanoribbon field-effect transistor," *Journal of Applied Physics*, vol. 103, p. 094510, January 2008
- [171] Qimin Yan et al., "Intrinsic Current-Voltage Characteristics of Graphene Nanoribbon Transistors and Effect of Edge Doping," *Nano Letters*, vol. 7, pp. 1469–1473, April 2007.
- [172] Kristof Tahy et al., "Graphene Transistors," in *Physics and Applications of Graphene - Experiments*, Sergey Mikhailov, Ed.: InTech, 2011, ch. 20, p. 475.
- [173] Xiangning Luo et al., "Current-carrying capacity of long and short-channel 2D graphene transistors," in *IEEE DRC Technical Digest*, June 2008, p. 29.
- [174] Ya-Fen Hsu and Guang-Yu Guo, "Anomalous integer quantum Hall effect in AA-stacked bilayer graphene," *Physical Review B*, vol. 82, p. 165404, October 2010
- [175] Edward McCann, "Asymmetry gap in the electronic band structure of bilayer graphene," *Physical Review B*, vol. 74, p. 161403, October 2006.
- [176] Li, Z. Q.; Henriksen, E. A.; Jiang, Z.; Hao, Z.; Martin, M. C.; Kim, P.; Stormer, H. L.; Basov, D. N. *Nat. Phys.* **2008**, 4, 532.
- [177] Wang, H.; Strait, J. A.; George, P. A.; Shivaraman, S.; et al. *Appl. Phys. Lett.* **2010**, 1917.
- [178] Schwierz F. Graphene transistors. *Nature Nanotechnology* 2010;5:487-96.
- [179] Meric I, Dean CR, Young AF, Baklitskaya N, Tremblay NJ, Nuckolls C, et al. Channel length scaling in graphene field-effect transistors studied with pulsed current-voltage measurements. *Nano Lett.* 11(3):1093-7.
- [180] Das Sarma S, Adam S, Hwang EH, Rossi E. Electronic transport in two-dimensional graphene. *Rev. Mod. Phys.* 2011;83:407-70.
- [181] J.A. Robinson, M. LaBella, M. Zhu, M. Hollander, R. Kasarda, Z. Hughes, K. Trumbull, R. Cavalero, and D. Snyder, *Appl. Phys. Lett.* **98**, 053103 (2011).
- [182] I. Meric, C. Dean, A. Young, J. Hone, P. Kim, and K. L. Shepard, *IEEE IEDM Tech. Dig.* **6-8**, 556 (2010).
- [183] Kim S, Nah J, Jo I, Shahrjerdi D, Colombo L, Yao Z, et al. Realization of a high mobility dual-gated graphene field-effect transistor with Al<sub>2</sub>O<sub>3</sub> dielectric. *Appl. Phys. Lett.* 2009;94:062107.1-3.

- [184] Kim BJ, Jang H, Lee SK, Hong BH, Ahn JH, Cho JH. High-performance flexible graphene field effect transistors with ion gel gate dielectrics. *Nano Lett.* 2010;10(9):3464-6.
- [185] Nagashio K, Nishimura T, Kita K, Toriumi A. Metal/graphene contact as a performance Killer of ultra-high mobility graphene analysis of intrinsic mobility and contact resistance. *IEEE IEDM Tech.Dig.* 2009;7-9:565–68.
- [186] Nagashio K, Nishimura T, Kita K, Toriumi A. Contact resistivity and current flow path at metal/graphene contact. *Appl. Phys. Lett.* 2010;97:143514.1-3.
- [187] Parrish KN, Akinwande D. Impact of contact resistance on the transconductance and linearity of graphene transistors. *Appl. Phys. Lett.* 2011;98:183505.1-3.
- [188] Schroeder DK. Semiconductor material and device characterization. John Wiley & Sons, Hoboken, NJ, 2006, p.138
- [189] Xia F, Perebeinos V, Lin YM, Wu Y, Avouris Ph. The origins and limits of metal-graphene junction resistance. *Nature Nanotechnology* 2011;6:179-84.
- [190] Berdebes D, Low T, Sui Y, Appenzeller J, Lundstrom M. Substrate Gating of Contact Resistance in Graphene Transistors. *IEEE Transaction on Electron Devices* 2011;11:3925-32.
- [191] Russo S, Craciun MF, Yamamoto M, Morpurgo AF, Tarucha S. Contact resistance in graphenebased devices. *Physica E* 2010;42:677-79.
- [192] Adam S, Hwang E H, Galitski V M and Das Sarma S 2007 A self-consistent theory of graphene transport *Proc. Natl. Acad. Sci.* **104** 18392–7
- [193] Huand B, Stander N, Sulpizio J A and Goldhaber-Gordon D 2008 Evidence of the role of contacts on the observed electron–hole asymmetry in graphene *Phys. Rev. B* **78** 121402
- [194] Chen Z and Appenzeller J 2009 Gate modulation of graphene contacts-on the scaling of graphene FET 2009 *Symp. On VLSI Technology Digest of Technical Paper* pp 128–9
- [195] Nouchi R, Shiraishi M and Suzuki Y 2008 Transfer characteristics in graphene field effect transistors with Co contacts *Appl. Phys. Lett.* **93** 152104
- [196] Nouchi R and Tanigaki K 2010 Charge–density depinning at metal contacts of graphene field effect transistors *Appl. Phys. Lett.* **96** 253503
- [197] Du X, Skachko I and Andrei E Y 2008 Towards ballistic transport in graphene *Int. J. Mod. Phys. B* **22** 4579–88
- [198] Novikov D S 2007 Numbers of donors and acceptors from transport measurements in graphene *Appl. Phys. Lett.* **91** 102102
- [199] Hwang E H, Adam S and Das Sarma S 2007 Carrier transport in two-dimensional graphene layers *Phys. Rev. Lett.* **98** 186806
- [200] Giovannetti G, Khomyakov P A, Brocks G, Karpan V M, van den Brink J and Kelly P J 2008 Doping graphene with metal contacts *Phys. Rev. Lett.* **101** 026803

- [201] Huard B, Sulpizio J A, Stander N, Todd K, Yang B and Goldhaber-Gordon D 2007 Transport measurements across a tunable potential barrier in graphene *Phys. Rev. Lett.* **98** 236803
- [202] Lee E J H, Balasubramanian K, Weitz R T, Burghard M and Kern K 2008 Contact and edge effect in graphene devices *Nat. Nanotechnol.* **3** 486–90
- [203] Khomyakov P A, Giovannetti G, Rusu P C, Brocks G, van den Brink J and Kelly P J 2009 First-principles study of the interaction and charge transfer between graphene and metals *Phys. Rev. B* **79** 195425
- [204] Barraza-Lopez S, Vanevic M, Kindermann M and Chou M Y 2010 Effects of metallic contacts on electron transport through graphene *Phys. Rev. Lett.* **104** 076807
- [205] De Marco P, Nardone N, Del Vitto A, Alessandri M, Santucci S and Ottaviano L 2010 Rapid identification of graphene flakes: alumina does it better *Nanotechnology* **21** 255703
- [206] Shi Y, Dong X, Chen P, Wang J and Li L-J 2009 Effective doping of single-layer graphene from underlying SiO<sub>2</sub> substrates *Phys. Rev. B* **79** 115402
- [207] Kang Y-J, Kang J and Chang K J 2008 Electronic structure of graphene and doping effect on SiO<sub>2</sub> *Phys. Rev. B* **78** 115404
- [208] Leenaerts O, Partoens B and Peeters F M 2008 Adsorption of H<sub>2</sub>O, NH<sub>3</sub>, CO, NO<sub>2</sub>, and NO on graphene: a first-principles study *Phys. Rev. B* **77** 125416
- [209] Huang B, Li Z, Liu Z, Zhou G, Hao S, Wu J, Gu B-L and Duan W 2008 Adsorption of gas molecules on graphene nanoribbons and its implication for nanoscale molecule sensor *J. Phys. Chem. C* **112** 13442–6
- [210] Lee J S, Ryu S, Yoo K, Choi I S, Yun W S and Kim J 2007 Origin of gate hysteresis in carbon nanotube field effect transistors *J. Phys. Chem. C* **111** 12504–7
- [211] Di Bartolomeo A, Rinzan M, Boyd A K, Yang Y, Guadagno L, Giubileo F and Barbara P 2010 Electrical properties and memory effects of field effect transistors from networks of single and double-walled carbon nanotubes *Nanotechnology* **21** 115204
- [212] Lohman T, von Klitzing K and Smet J H 2009 Four-terminal magneto-transport in graphene p–n junctions created by spatially selective doping *Nano Lett.* **9** 1973–9
- [213] Joshi P, Romero E, Neal A T, Toutam V K and Tadigataba S A 2010 Intrinsic doping and gate hysteresis in graphene field effect devices fabricated on SiO<sub>2</sub> substrates *J. Phys.: Condens. Matter* **22** 334214.
- [214] Lafkioti M, Krauss B, Lohmann T, Zschieschang U, Kluak H, Klitzing K V and Smet J H 2010 Graphene on a hydrophobic surface: doping reduction and hysteresis suppression under ambient conditions *Nano Lett.* **10** 1149–53
- [215] Venugopal A, Colombo L and Vogel E M 2010 Contact resistance in few and multilayer graphene devices *Appl. Phys. Lett.* **96** 013512

- [216] Nagashio K, Nishimura T, Kita K and Toriumi A 2010 Systematic investigation of the intrinsic channel properties and contact resistance of monolayer and multilayer graphene field-effect transistor *Japan. J. Appl. Phys.* **49** 051304
- [217] Nagashio K, Nishimura T, Kita K and Toriumi A 2009 Metal/graphene contact as a performance Killer of ultra-high mobility graphene analysis of intrinsic mobility and contact resistance *IEDM: IEEE Int. Electron Devices Mtg* pp 565–8
- [218] Lemme M C, Echtermeyer T J, Baus M, Szafranek B N, Bolten J, Schmidt M, Wahlbrink T and Kurz H 2008 Mobility in graphene double gate field effect transistors *Solid-State Electron.* **52** 514–8
- [219] Hummel C, Schwierz F, Hanish A and Pezoldt J 2010 Ambient and temperature dependent electric properties of backgate graphene transistors *Phys. Status Solidi b* **247** 903–6
- [220] Liao Z-M, Han B-H, Zhou Y-B and Yua D-P 2010 Hysteresis reversion in graphene field-effect transistors *J. Chem. Phys.* **133** 044703.
- [221] Chiu H-Y, Pereboinos V, Lin Y-M and Avouris P 2010 Controllable p–n junction formation in monolayer graphene using electrostatic substrate engineering *Nano Lett.* **10** 4634–9
- [222] Huard B, Sulpizio J A, Stander N, Todd K, Yang B and Goldhaber-Gordon D 2007 Transport measurements across a tunable potential barrier in graphene *Phys. Rev. Lett.* **98** 236803
- [223] Mueller T, Xia F, Freitag M, Tsang J and Avouris Ph 2009 Role of contacts in graphene transistors: a scanning photocurrent study *Phys. Rev. B* **79** 245430
- [224] Golizadeh-Majorad R and Datta S 2009 Effect of contact induced states on minimum conductivity in graphene *Phys. Rev. B* **79** 085410
- [225] Di Bartolomeo A, Yang Y, Rinzan M B M, Boyd A K and Barbara P 2010 Record endurance for single-walled carbon nanotube-based memory cell *Nanoscale Res. Lett.* **5** 1852–5
- [226] Di Bartolomeo A, Ruecker H, Schley P, Fox A, Lischke S and Na K-Y 2009 A single-poly EEPROM cell for embedded memory applications *Solid-State Electron.* **53** 644–8
- [227] Chen F, Xia J and Tao N 2009 Ionic screening of charged-impurity scattering in graphene *Nano Lett.* **9** 1621–5
- [228] Berciou D, De Martino A. Spin-resolved scattering through spin-orbit nanostructures in graphene. *Phys. Rev. B* 2010;81:165410.1-9.
- [229] Hwang EH, Das Sarma S. Screening-induced temperature-dependent transport in two-dimensional graphene. *Phys. Rev. B* 2009;79:165404.1-12.
- [230] Iijima, S.; Helical microtubules of graphitic carbon. *Nature* **1991**, 354, 56–58.
- [231] Eletskii, A.V. Carbon nanotubes and their emission properties. *Phys. Usp.* **2002**, 45, 369
- [232] Passacantando, M.; Bussolotti, F.; Santucci, S.; Di Bartolomeo, A.; Giubileo, F.; Iemmo, L.; Cucolo, A. M. Field Emission from a selected multi-wall carbon nanotubes. *Nanotechnology* **2008**, 19, 395701-7.

- [233] Di Bartolomeo, A.; Scarfato, A.; Giubileo, F.; Bobba, F.; Biasiucci, M.; Cucolo, A. M.; Santucci, S.; Passacantando, M. A local field emission study of partially aligned carbon-nanotubes by atomic force microscope probe. *Carbon* **2007**, *45*, 2957-2971.
- [234] De Heer, W. A.; Chatelain, A.; Ugarte, D. A Carbon Nanotube Field-Emission Electron Source. *Science* **1995**, *270*, 1179-1180.
- [235] Fowler, R. H.; Nordheim, L. W. Electron Emission in Intense Electric Fields. *A Proc. R. Soc. Lond. A* **1928**, *119*, 173-181.
- [236] Physics Of Semiconductor Devices, **S. M. Sze**, A John Wiley & Sons, Jnc., Publication
- [237] Barnes, W.D. A. Dereux, and T.W. Ebbesen. 2003. Surface plasmon subwavelength optics. *Nature* **424**:824-830.
- [238] The Optical Properties of Thin Solid Films O.S. Heavens, Dover Publications Inc.; 2Rev Ed edition (15 Jun 1992)
- [239] H. Raether. Surface plasmons on smooth and rough surfaces and on gratings,Volume 111 of Springer tracts in modern physics. Springer-Verlag, 1988.
- [240] H. A. Atwater. The promise of plasmonics. *Scientific American*, **296**(4):56{63 (2007).
- [241] R. Zia, J. A. Schuller, A. Chandran, and M. L. Brongersma. Plasmonics: the next chip-scale technology. *Materials Today*, **9**(7-8):20{27 (2006).
- [242] A. Polman. Plasmonics applied. *Science*, **322**(5903):868{869 (2008).
- [243] E. Ozbay. Plasmonics: merging photonics and electronics at nanoscale dimensions. *Science*, **311**(5758):189{193 (2006).
- [244] S. I. Bozhevolnyi, V. S. Volkov, E. Devaux, J.-Y. Laluet, and T. W. Ebbesen. Channel plasmon subwavelength waveguide components including interferometers and ring resonators. *Nature*, **440**(7083):508{511 (2006).
- [245] H. Ditlbacher, J. R. Krenn, G. Schider, A. Leitner, and F. R. Aussenegg. Two-dimensional optics with surface plasmon polaritons. *Applied Physics Letters*, **81**(10):1762{1764 (2002).
- [246] Kittel C 2004 Introduction to Solid State Physics (New York: Wiley)
- [247] Katherine A. Willets and Richard P. Van Duyne, Annu ,Localized Surface Plasmon Resonance Spectroscopy and Sensing Rev. Phys. Chem. 2007.58:267-97
- [248] William 1 Barnes, surface plasmon-polariton length scales: a route to sub-wavelength optics journal of optics a: pure and applied optics 8 (2006) s87-s93.
- [249] Otto A 1968 Excitation of nonradiative surface plasma waves in silver by method of frustrated total reflection Z. Phys. **216** 398
- [250] Craig F. Bohren & Donald R. Huffman Absorption and Scattering of Light by Small Particles , Wiley VCH; New edition edition (23 April 1998)

- [251] Mie G. 1908. Contributions to the optics of turbid media, especially colloidal metal solutions. *Ann. Phys.* 25:377-445
- [252] Mak, K. F.; Sfeir, M. Y.; Wu, Y.; Lui, C. H.; Misewich, J. A.; Heinz, T. F. *Phys. Rev. Lett.* **2008**, *101*, 196405.
- [253] Chen, C. F.; Park, C. H.; Boudouris, B. W.; Horng, J.; Geng, B.; Girit, C.; Zettl, A.; Crommie, M. F.; Segalman, R. A.; Louie, S. G.; Wang, F. *Nature* **2011**, *471*, 617–620.
- [254] C. Loo, A. Lowery, N. J. Halas, J. West, and R. Drezek, “Immunotargeted nanoshells for integrated cancer imaging and therapy.,” *Nano Letters*, vol. 5, no. 4, pp. 709–11, Apr. 2005.
- [255] P. Zijlstra, J. W. M. Chon, and M. Gu, “Five-dimensional optical recording mediated by surface plasmons in gold nanorods,” *Nature*, vol. 459, no. 7245, pp. 410–413, 2009.
- [256] M. Svedendahl, S. Chen, A. Dmitriev, and M. Kall, “Refractometric Sensing Using Propagating versus Localized Surface Plasmons : A Direct Comparison,” *Nano Letters*, vol. 9, pp. 4428–4433, 2009
- [257] N.-Y. Kim, M.-K. Oh, S.-H. Park, S.-K. Kim, and B.-H. Hong, “Effect of Gold Substrates on the Raman Spectra of Graphene,” *Bulletin of the Korean Chemical Society*, vol. 31, no. 4, pp. 999–1003, Apr. 2010.
- [258] S. Sun and P. Wu, “Competitive surface-enhanced Raman scattering effects in noble metal nanoparticle-decorated graphene sheets.,” *Physical chemistry chemical physics : PCCP*, vol. 13, no. 47, pp. 21116–20, Dec. 2011.
- [259] J. Lee, S. Shim, B. Kim, and H. S. Shin, “Surface-enhanced Raman scattering of single and few-layer graphene by the deposition of gold nanoparticles.,” *Chemistry (Weinheim an der Bergstrasse, Germany)*, vol. 17, no. 8, pp. 2381–7, Feb. 2011.
- [260] V. G. Kravets, F. Schedin, R. Jalil, L. Britnell, K. S. Novoselov, and a. N. Grigorenko, “Surface Hydrogenation and Optics of a Graphene Sheet Transferred onto a Plasmonic Nanoarray,” *The Journal of Physical Chemistry C*, vol. 116, no. 6, pp. 3882–3887, Feb. 2012.
- [261] V. K. Kodali, J. Scrimgeour, S. Kim, J. H. Hankinson, K. M. Carroll, W. a de Heer, C. Berger, and J. E. Curtis, “Non perturbative chemical modification of graphene for protein micropatterning.,” *Langmuir*, vol. 27, no. 3, pp. 863–5, Feb. 2011
- [262] N. Félidj, G. Laurent, J. Aubard, G. Lévi, A. Hohenau, J. R. Krenn, and F. R. Aussenegg, “Grating-induced plasmon mode in gold nanoparticle arrays.,” *The Journal of chemical physics*, vol. 123, no. 22, p. 221103, Dec. 2005.
- [263] A. Christ, S. Tikhodeev, N. Gippius, J. Kuhl, and H. Giessen, “Waveguide-Plasmon Polaritons: Strong Coupling of Photonic and Electronic Resonances in a Metallic Photonic Crystal Slab,” *Physical Review Letters*, vol. 91, no. 18, pp. 1–4, Oct. 2003.

- [264] A. Yurtsever, R. M. van der Veen, and A. H. Zewail, “Subparticle Ultrafast Spectrum Imaging in 4D Electron Microscopy,” *Science*, vol. 335, no. 6064, pp. 59–64, Jan. 2012.
- [265] J. Deng, Y. Song, Y. Wang, and J. Di, “Label-free optical biosensor based on localized surface plasmon resonance of twin-linked gold nanoparticles electrodeposited on ITO glass.,” *Biosensors & bioelectronics*, vol. 26, no. 2, pp. 615–9, Oct. 2010.
- [266] Y. Wang, J. Deng, J. Di, and Y. Tu, “Electrodeposition of large size gold nanoparticles on indium tin oxide glass and application as refractive index sensor,” *Electrochemistry Communications*, vol. 11, no. 5, pp. 1034–1037, May 2009.
- [267] Y. Hu, Y. Song, Y. Wang, and J. Di, “Electrochemical synthesis of gold nanoparticles onto indium tin oxide glass and application in biosensors,” *Thin Solid Films*, vol. 519, no. 19, pp. 6605–6609, Jul. 2011.
- [268] Y. Zhang and W. Jiang, “Decorating graphene sheets with gold nanoparticles for the detection of sequence-specific DNA,” *Electrochimica Acta*, vol. 71, pp. 239–245, 2012.
- [269] S. Hu, Y. Wang, X. Wang, L. Xu, J. Xiang, and W. Sun, “Electrochemical detection of hydroquinone with a gold nanoparticle and graphene modified carbon ionic liquid electrode,” *Sensors and Actuators B*, vol. 168, pp. 27–33, 2012.
- [270] L. Wang, H. Zhu, H. Hou, and Z. Zhang, “A novel hydrogen peroxide sensor based on Ag nanoparticles electrodeposited on chitosan-graphene oxide / cysteamine-modified gold electrode,” *Journal of Solid State Electrochemistry*, vol. 16, pp. 1693–1700, 2012.
- [271] G. Wang, G. Zhang, H. Huang, and L. Wang, “Electrochemical immunosensor for afetoprotein based on gold nanoparticles/graphene-prussian blue,” *Chinese Journal of Chemistry*, vol. 30, pp. 485–490, 2012.
- [272] S. Li, D. Deng, Q. Shi, and S. Liu, “Electrochemical synthesis of a graphene sheet and gold nanoparticle-based nanocomposite , and its application to amperometric sensing of dopamine,” *Microchimica Acta*, vol. 177, pp. 325–331, 2012.
- [273] C. Liu, K. Wang, S. Luo, Y. Tang, and L. Chen, “Direct Electrodeposition of Graphene Enabling the One-Step Synthesis of Graphene–Metal Nanocomposite Films,” *Small*, vol. 7, pp. 1203–1206, 2011.
- [274] B. Jiang, M. Wang, Y. Chen, J. Xie, and Y. Xiang, “Highly sensitive electrochemical detection of cocaine on graphene / AuNP modified electrode via catalytic redox-recycling amplification,” *Biosensors and Bioelectronics*, vol. 32, pp. 305–308, 2012.
- [275] J. Yang, S. Deng, J. Lei, H. Ju, and S. Gunasekaran, “Electrochemical synthesis of reduced graphene sheet – AuPd alloy nanoparticle composites for enzymatic biosensing,” *Biosensors and Bioelectronics*, vol. 29, pp. 159–166, 2011.

- [276] T. J. Echtermeyer, L. Britnell, P. K. Jasnos, A. Lombardo, R. V. Gorbachev, A. N. Grigorenko, A. K. Geim, A. C. Ferrari, and K. S. Novoselov, “Strong plasmonic enhancement of photovoltage in graphene,” *Nature communications*, vol. 2, p. 458, Jan. 2011.
- [277] I. Khrapach, F. Withers, T. H. Bointon, D. K. Polyushkin, W. L. Barnes, S. Russo, and M. F. Craciun, “Novel highly conductive and transparent graphene based conductors,” *Advanced Materials*, vol. 24, no. 12, pp. 2844–2849, 2012.
- [278] A. Yurtsever, R. M. van der Veen, and A. H. Zewail, “Subparticle Ultrafast Spectrum Imaging in 4D Electron Microscopy,” *Science*, vol. 335, no. 6064, pp. 59–64, Jan. 2012.
- [279] K. L. Kelly, E. Coronado, L. L. Zhao, and G. C. Schatz, “The Optical Properties of Metal Nanoparticles: The Influence of Size, Shape, and Dielectric Environment,” *Journal of Physical Chemistry B*, vol. 107, pp. 668–677, 2003.
- [280] W. A. Murray, B. Auguié, and W. L. Barnes, “Sensitivity of Localized Surface Plasmon Resonances to Bulk and Local Changes in the Optical Environment,” *The Journal of Physical Chemistry C*, vol. 113, no. 13, pp. 5120–5125, Apr. 2009.
- [281] C. Sönnichsen, T. Franzl, T. Wilk, G. V. Plessen, and J. Feldmann, “Drastic Reduction of Plasmon Damping in Gold Nanorods,” *Physical Review Letters*, vol. 88, p. 077402, 2002.
- [282] M. W. Knight, Y. Wu, J. B. Lassiter, P. Nordlander, and N. J. Halas, “Substrates matter: influence of an adjacent dielectric on an individual plasmonic nanoparticle.,” *Nano letters*, vol. 9, no. 5, pp. 2188–92, May 2009.
- [283] Bruna M and Borini S 2009 Optical constants of graphene layers in the visible range *Applied Physics Letters* **94** 3
- [284] Knight M W, Fan J, Capasso F and Halas N J 2010 Influence of excitation and collection geometry on the dark field spectra of individual plasmonic nanostructures. *Optics Express* **18** 2579–87
- [285] R. V. Gorbachev, F. V. Tikhonenko, A. S. Mayorov, D. W. Horsell, and A. K. Savchenko, *Physical Review Letters* 98, 176805 (2007).
- [286] A. F. Young and P. Kim, *Nature Physics* 5, 222 (2009).
- [287] S. Russo, J. B. Oostinga, D. Wehenkel, H. B. Heersche, S. Shams Sobhani, L. M. K. Vandersypen, and A. F. Morpurgo , Observation of Aharonov-Bohm conductance oscillations in a graphene ring *Phys. Rev. B* 77, 085413 (2008).
- [288] R. A. Webb, S. Washburn, C. P. Umbach, and R. B. Laibowitz, *Phys. Rev. Lett.* 54, 2696 (1985).
- [289] A. Bachtold, C. Strunk, J.-P. Salvetat, J.-M. Bonard,L. Forro, T. Nussbaumer, and C. Schönenberger, *Nature* 397, 673 (1999).
- [290] K. S. Novoselov, A. K. Geim, S. V. Morozov, D. Jiang,M. I. Katsnelson, I. V. Grigorieva, S. V. Dubonos, and A. A. Firsov, *Nature* 438, 197 (2005).

- [291] Y. Zhang, Y.-W. Tan, H. L. Stormer, and P. Kim, Nature 438, 201 (2005).
- [292] S. Washburn and R. A. Webb, Advances in Physics 35, 375 (1986).
- [293] L. Angers, E. Zakka-Bajjani, R. Deblock, S. Guéron, H. Bouchiat, A. Cavanna, U. Gennser, and M. Polianski, Phys. Rev. B 75, 115309 (2007)
- [294] Sharvin & Sharvin, JETP Lett. **34**, 272 (1981)
- [295] G. Timp *et al.*, Phys. Rev. Lett. **58**, 2814 (1987)