

Papers for the tutorial:

1. Seminar 03.05:

Prediction and discovery of graphene and other 2D materials

The Band Theory of Graphite

P. R. Wallace

Phys. Rev. 71, 622 (1947)

Two-dimensional atomic crystals

Kostya S Novoselov, D Jiang, F Schedin, TJ Booth, VV Khotkevich, SV Morozov, Andre K Geim
PNAS (30), 10451-10453 (2004)

Electric field effect in atomically thin carbon films

Kostya S Novoselov, Andre K Geim, Sergei V Morozov, De-eng Jiang, Yanshui Zhang, Sergey V
Dubonos, Irina V Grigorieva, Alexandr A Firsov
Science 306 (5696), 666-669 (2004)

2. Seminar 10.05:

Nano-fabrication and transport characterization of graphene and 2D materials

Raman Spectrum of Graphene and Graphene Layers

A. C. Ferrari, J. C. Meyer, V. Scardaci, C. Casiraghi, M. Lazzeri, F. Mauri, S. Piscanec, D. Jiang,
K. S. Novoselov, S. Roth, and A. K. Geim

Phys. Rev. Lett. 97, 187401 (2006)

Graphene Thickness Determination Using Reflection and Contrast Spectroscopy

Z. H. Ni, H. M. Wang, J. Kasim, H. M. Fan, T. Yu, Y. H. Wu, Y. P. Feng, and Z. X. Shen
Nano Letters 7, 9, 2758–2763 (2007)

Observation of electron–hole puddles in graphene using a scanning single-electron transistor

J. Martin, N. Akerman, G. Ulbricht, T. Lohmann, J. H. Smet, K. von Klitzing & A. Yacoby
Nature Physics 4, pages144–148 (2008)

Boron nitride substrates for high-quality graphene electronics

Cory R Dean, Andrea F Young, Inanc Meric, Chris Lee, Lei Wang, Sebastian Sorgenfrei, Kenji
Watanabe, Takashi Taniguchi, Phillip Kim, Kenneth L Shepard, James Hone

Nature Nanotechnology 5 (10), 722-726 (2010)

One-dimensional electrical contact to a two-dimensional material

Lei Wang, I Meric, PY Huang, Q Gao, Y Gao, H Tran, T Taniguchi, Kenji Watanabe, LM Campos,
DA Muller, J Guo, P Kim, J Hone, KL Shepard, Cory R Dean

Science 342 (6158), 614-617 (2013)

3. Seminar 31.05:

Consequences of the Dirac equation and relativistic electrons in graphene

Erasing electron mass

Charles L. Kane

Nature 438, pages 168–170 (2005)

Two-dimensional gas of massless Dirac fermions in graphene

Kostya S Novoselov, Andre K Geim, Sergei Vladimirovich Morozov, Dingde Jiang, Michail I Katsnelson, Irina V Grigorieva, SV Dubonos, and AA Firsov

Nature 438 (7065), 197-200 (2005)

Quantum interference and Klein tunnelling in graphene heterojunctions

AF Young, P Kim

Nature Physics 5 (3), 222-226 (2009)

Massive Dirac fermions and Hofstadter butterfly in a van der Waals heterostructure

Benjamin Hunt, Javier D Sanchez-Yamagishi, Andrea F Young, Matthew Yankowitz, Brian J LeRoy, Kenji Watanabe, Takashi Taniguchi, Pilkyung Moon, Mikito Koshino, Pablo Jarillo-Herrero, Raymond C Ashoori

Science 340 (6139), 1427-1430 (2013)

4. Seminar 07.06:

Relativistic Quantum Hall effect and Berry curvature

Experimental observation of the quantum Hall effect and Berry's phase in graphene

Y Zhang, YW Tan, HL Stormer, P Kim

Nature 438 (7065), 201-204 (2005)

Multicomponent fractional quantum Hall effect in graphene

Cory R Dean, Andrea F Young, P Cadden-Zimansky, L Wang, H Ren, Kenji Watanabe, T Taniguchi, P Kim, J Hone, KL Shepard

Nature Physics 7 (9), 693-696 (2011)

5. Seminar 21.06:

Haldane model and Topological Insulators

Model for a Quantum Hall Effect without Landau Levels: Condensed-Matter Realization of the "Parity Anomaly"

F. D. M. Haldane

Phys. Rev. Lett. 61 (1987)

Quantum Spin Hall Effect in Graphene
C. L. Kane and E. J. Mele
Phys. Rev. Lett. 95, 226801 (2005)

Quantum Spin Hall Insulator State in HgTe Quantum Wells
M. König, S. Wiedmann, C. Brüne, A. Roth, H. Buhmann, L. W. Molenkamp, X. L. Qi and S. C. Zhang
Science 318, 5851, 766-770 (2007)

The birth of topological insulators
Joel E. Moore
Nature 464, 194–198 (2010)

6. Seminar 28.06:

Strongly correlated phases in AB and ABC graphene

Broken-Symmetry States in Doubly Gated Suspended Bilayer Graphene
R. T. Weitz, M. T. Allen, B. E. Feldman, J. Martin and A. Yacoby
Science 330, 6005, 812-816 (2010)

Superconductivity in rhombohedral trilayer graphene
Haoxin Zhou, Tian Xie, Takashi Taniguchi, Kenji Watanabe & Andrea F. Young
Nature 598, 434–438 (2021)

Isospin magnetism and spin-polarized superconductivity in Bernal bilayer graphene
Haoxin Zhou, Ludwig Holleis, Yu Saito, Liam Cohen, William Huynh, Caitlin L Patterson, Fangyuan Yang, Takashi Taniguchi, Kenji Watanabe, Andrea F Young
Science 375 (6582), 774-778 (2022)

7. Seminar 12.07:

Moirés super-potentials

Emergence of superlattice Dirac points in graphene on hexagonal boron nitride
Matthew Yankowitz, Jiamin Xue, Daniel Cormode, Javier D. Sanchez-Yamagishi, K. Watanabe, T. Taniguchi, Pablo Jarillo-Herrero, Philippe Jacquod & Brian J. LeRoy
Nature Physics 8, 382–386 (2012)

Hofstadter’s butterfly and the fractal quantum Hall effect in moiré superlattices
Cory R Dean, L Wang, P Maher, C Forsythe, Fereshte Ghahari, Y Gao, Jyoti Katoch, M Ishigami, P Moon, M Koshino, T Taniguchi, Kenji Watanabe, KL Shepard, J Hone, P Kim
Nature 497 (7451), 598-602 (2013)

Magic-angle twisted bilayer graphene

Moiré bands in twisted double-layer graphene

Rafi Bistritzer and Allan H. MacDonald

PNAS, 108 (30) 12233-12237 (2011)

Correlated insulator behaviour at half-filling in magic-angle graphene superlattices

Yuan Cao, Valla Fatemi, Ahmet Demir, Shiang Fang, Spencer L Tomarken, Jason Y Luo, Javier D Sanchez-Yamagishi, Kenji Watanabe, Takashi Taniguchi, Efthimios Kaxiras, Ray C Ashoori, Pablo Jarillo-Herrero

Nature 556 (7699), 80-84 (2018)

Unconventional superconductivity in magic-angle graphene superlattices

Yuan Cao, Valla Fatemi, Shiang Fang, Kenji Watanabe, Takashi Taniguchi, Efthimios Kaxiras, Pablo Jarillo-Herrero

Nature 556 (7699), 43-50 (2018)

Intrinsic quantized anomalous Hall effect in a moiré heterostructure

M Serlin, CL Tschirhart, H Polshyn, Y Zhang, J Zhu, K Watanabe, T Taniguchi, L Balents, AF Young

Science 367 (6480), 900-903 (2020)

8. Seminar 19.07:

Other strongly interacting moiré bilayers

Correlated insulating states at fractional fillings of moiré superlattices

Yang Xu, Song Liu, Daniel A Rhodes, Kenji Watanabe, Takashi Taniguchi, James Hone, Veit Elser, Kin Fai Mak, Jie Shan

Nature 587 (7833), 214-218 (2020)

Signatures of fractional quantum anomalous Hall states in twisted MoTe₂

Jiaqi Cai, Eric Anderson, Chong Wang, Xiaowei Zhang, Xiaoyu Liu, William Holtzmann, Yinong Zhang, Fengren Fan, Takashi Taniguchi, Kenji Watanabe, Ying Ran, Ting Cao, Liang Fu, Di Xiao, Wang Yao & Xiaodong Xu

Nature 622, 63–68 (2023)

Fractional quantum anomalous Hall effect in multilayer graphene

Zhengguang Lu, Tonghang Han, Yuxuan Yao, Aidan P. Reddy, Jixiang Yang, Junseok Seo, Kenji Watanabe, Takashi Taniguchi, Liang Fu & Long Ju

Nature 626, 759–764 (2024)