

Curriculum Vitae

Xi Chen

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Part A BRIEF DESCRIPTION

A.1. Current position

Group Leader, Ramón y Cajal Fellow, University of the Basque Country since 2019.
Before 2019: Full Professor in Shanghai University from 2014-2019.

A.2. Education

Ph.D, Shanghai University, China 2007; Bachelor, Shanghai University, China 2001

A.3. General indicators of quality of scientific production

Metrics (Google Scholar: <https://scholar.google.com/citations?user=RFDBI4kAAAAJ&hl=en>):
Total Citations: 6523 (01.10.2021).
Publications: 126 published in WoS (1 Nat. Comm., 1 npj Quantum Information, 6 PRL).
h-index: 38 (Google Scholar)

Part B. CV SUMMARY

Dr. Xi Chen, as a Ph.D student in Shanghai University since 2001, began with the earliest study on mesoscopic transport from 2001. The focus at that time was on the delay time and Goos Hanchen (GH) effect. Since there is a connection between ac-response and timescales, his work, as pointed out by Buttiker, touches certainly on an important subject of the role the various time scales are playing in semiconductor barriers. Later, along this research line, as lecturer and associate professor in Shanghai University, he has found independently many interesting electron-optical phenomena, such as Bragg like reflection, zero-average wave number gap, and electron waveguide in graphene. More importantly, electron waveguide has been carried out by C. M. Marcus's group in Harvard University to realize the electronic fibre in graphene. Indeed, optical analogies can provide a deep understanding of some phenomena in atom optics or complex condensed matter systems. With his contribution, he has published a review article in Journal of Optics, and a book chapter.

Awarded with a Juan de la Cierva fellowship, he entered the QulnST group of Prof. J. Gonzalo Muga at UPV-EHU, Spain. He concentrated first on a new cooling method based on harmonic trap expansions and on state preparation of two or three level atoms. During his stay at Bilbao, he was extremely successful. He has developed the emerging field of shortcuts to adiabaticity. Several results have been implemented experimentally in the group of G. Labeyrie, O. Morsch, D. Suter and also are extended to other fields. He has already published 1 Nature Communications and 6 Physical Review Letters. Dr. Xi Chen has expertise in quantum optics and quantum control.

He came full professor and led a group in Shanghai since 2013. Recently, he has been awarded with Ramon y Cajal fellowship, working in QUTIS of UPV/EHU, Spain since 2019. He is developing on the quantum computing by using IBM and D-Wave quantum annealers, see recent papers on arXiv:1906.10074, 1906.08140, 1904.05808, 1904.05803. He is focusing on the application of shortcuts to adiabaticity to speed up adiabatic quantum simulation and computing, and also improve quantum sensing as well, by incorporating the start-of-the-art

quantum machine learning. His research so far is multidisciplinary and covers different aspects in physics, such as mesoscopic physics, quantum control, quantum optics, atom physics and quantum computing.

He has published >130 papers in international collaborations with researchers from a variety of countries: US, Germany, Spain, France, China. He is the principal investigator of 12 projects. He has more than 50 invited and contributed talks in International Conferences and Workshops. He has advised 6 Ph.D candidates and more than 20 master students and undergraduate students. He teaches courses of College Physics, Quantum Mechanics and Introduction to Quantum Optics. He is the main organizer of 3 international workshops and more than 10 local workshops on nonlinear dynamics, quantum control, quantum information and quantum computing, even with company currently. He is selected as Editor Board for Scientific Report and referees the papers frequently for Nat. Nanotechnology, Phys. Rev. Lett., Phys. Rev. A&E, Appl. Phys. Lett. Opt. Lett., and so on.

Part C. RELEVANT MERITS

C.1. Publications (selected)

1. Yongcheng Ding, J. D. Martin-Guerrero, M. Sanz, R. Magdalena-Benedicto, Xi Chen, and E. Solano, Retrieving quantum information with active learning, Phys. Rev. Lett. 124, 140504 (2020).
 2. Ying Yan, Chunyan Shi, Adam Kinos, Hafsa Syed, Sebastian P. Horvath, Andreas Walther, Lars Rippe, Xi Chen, and Stefan Kröll, Experimental implementation of precisely tailored light-matter interaction via inverse engineering, npj Quantum Information 7, 138 (2021).
 3. Narendra N. Hegade, Koushik Paul, Yongcheng Ding, Mikel Sanz, F. Albarrán-Arriagada, Enrique Solano, and Xi Chen, Shortcuts to Adiabaticity in Digitized Adiabatic Quantum Computing, Phys. Rev. Applied. 15, 024038 (2021).
 4. Yongcheng Ding, Yue Ban, José D. Martín-Guerrero, Enrique Solano, Jorge Casanova, and Xi Chen, Breaking Adiabatic Quantum Control with Deep Learning, Phys. Rev. A 103, L040401 (2021).
 5. Yan-Xiong Du, Zhen-Tao Liang, Yi-Chao Li, Xian-Xian Yue, Qing-Xian Lv, Wei Huang, Xi Chen, Hui Yan, and Shi-Liang Zhu, Experimental realization of stimulated Raman shortcut-to-adiabatic passage with cold atoms, Nature Commun. 7, 12479 (2016).
 6. S. Martínez-Garaot, E. Torrontegui, Xi Chen, M. Modugno, D. Guéry-Odelin, Shuo-Yen Tseng, and J. G. Muga, Vibrational mode multiplexing of ultracold atoms, Phys. Rev. Lett. 111, 213001 (2013).
 7. S. Ibáñez, Xi Chen, E. Torrontegui, J. G. Muga, and A. Ruschhaupt, Multiple Schrödinger pictures and dynamics in shortcuts to adiabaticity, Phys. Rev. Lett. 109, 100403 (2012).
 8. Yue Ban, Xi Chen, E. Ya Sherman, and J. G. Muga, Fast and robust spin manipulation in a quantum dot by electric fields, Phys. Rev. Lett. 109, 206602 (2012).
 9. Xi Chen, A. Ruschhaupt, S. Schmidt, A. del Campo, D. Guéry-Odelin, and J. G. Muga, Fast optimal frictionless atom cooling in harmonic traps: shortcut to adiabaticity, Phys. Rev. Lett. 104, 063002 (2010).
 10. Xi Chen, I. Lizuain, A. Ruschhaupt, D. Guéry-Odelin, and J. G. Muga, Shortcut to adiabatic passage in two and three level atoms, Phys. Rev. Lett. 105, 123003 (2010).
- Review:
11. Xi Chen, Xiao-Jing Lu, Yue Ban, and Chun-Fang Li, Electronic analogy of Goos-Hanchen

effect: a review, J. Opt. 15, 033001 (2013).

12. E. Torrontegui, S. Ibáñez, S. Martínez-Garaot, M. Modugno, A. del Campo, D. Guéry-Odelin, A. Ruschhaupt, Xi Chen, and J. G. Muga, Shortcuts to Adiabaticity. In: Paul Berman, Ennio Arimondo, Chun Lin, editors, Adv. Atom. Mol. Opt. Phys. 62, Chennai: Academic Press, 2013, 117-169.

Book Chapter:

1. Xi Chen and Li-Gang Wang, Propagation of electron waves in monolayer graphene and optical simulations with negative-zero-positive index metamaterials, Physics and Applications of Graphene-Theory, ISBN 978-953-307-152-7, Edited by Sergey Mikhailov.

C.2. Research projects, Fellowships, Grants, and Awards

1. National Science Foundation of China (12075145, 11474193, 61176118, 60806041)
2. Research Fund for the Doctoral Program (20133108110003)
3. 2020, Highly cited Chinese Scholar (Elsevier)
4. 2018, Ramon y Cajal fellowship
- 5.. 2014, Shanghai Shuguang Program
6. 2013 Eastern Scholar in Shanghai and Extension in 2018
7. 2013, Shanghai Pujiang Program
8. 2008, Juan de la Cierva fellowship
9. 2008, Shanghai Rising Star Program and Extension in 2012
10. 2007, Shangha Chengguang Program

C.3. Contracts, previous positions

1. Shanghai University, "Eastern Scholar" Professor, 05/2013
2. Shanghai University, Full professor since 11/2011
3. QInST Group, UPV-EHU Postdoctor 04/2009
4. Shanghai University Associate Professor 03/2009
5. Shanghai University Lecturer 04/2007

Short visit (selected):

6. CSIC, Madrid Spain, 15/07/2018-25/08/2018 Prof. Gloria Platero
7. OIST, Okinawa, Japan, 05/01/2015-17/01/2015 Prof. Thomas Busch
8. UPV-EHU Bilbao, Spain, 10/05/2014-15/06/2014 Prof. Eugene Ya Sherman
9. KTIPT Beijing, China, 07/04/2012-27/04/2013
10. Regensburg University, German, 04/02/2013-16/02/2013 Prof. Klaus Richter

C.4. Patents

Chinese Patent ZL 2018 1 0234933.5: Pulse engineering for arbitrary state superposition in thee-level system, 2018, with Ying Yan and Yi-Chao Li.

C.5. Impact - Technological transfer

A. Fast Optimal Frictionless Atom Cooling in Harmonic Traps. -Phys. Rev. Lett. 104, 063002 (2010).

The relevant experiments: (a) The group of Prof. G. Labeyrie in Nice, see the publications in Phys. Rev. A 82, 033430 (2010) and EPL 93, 23001 (2011). (b) The group of Prof. J. Schmiedmayer in Vienna, see, Sci. Rep. 5, 10506 (2015). (c) The group of Prof. D. J. Wineland in NIST, see Phys. Rev. Lett. 109, 080502 (2012). (d) The group of Prof. Hai-Bin Wu in Shanghai, see Phys. Rev. A 97, 013628 (2018).

B. Fast Population Transfer In Two- or Three Level Systems. - Phys. Rev. Lett. 105, 123003

(2010).

The relevant results have been implemented experimentally in the following list: (a) The group of Prof. E. Arimondo and O. Morsch in Pisa, see the publication, *Nature Phys.* 8, 147 (2012). (b) The group of Prof. D. Suter in Dortmund, see *Phys. Rev. Lett.* 110, 240501 (2013). (c) Collaborating with experimental group of Prof. Shi-Liang Zhu and Hui Yan in Guangzhou, see *Nature Comm.* 7, 12479 (2016). Also, the theoretical work has been published in *Phys. Rev A* 94, 063411 (2016). The work was awarded with the one of most significant breakthrough in the field of optics in China, 2017.

C. Electron-Optics Effect in Semiconductor and Graphene. - *Appl. Phys. Lett.* 94, 212105 (2009).

The relevant experiments are as follows: (a) The group of Prof. C. M. Marcus in Harvard, see the publication in *Nature Nanotechnol.* 6, 222 (2011). (b) The group of Prof. C. Schönenberger in Basel, see *Nature Comm.* 4, 2342 (2013). See also relevant publications, *Nano Lett.* 15, 5819 (2015) and *Nature Phys.* 12, 128 (2016).

C.6. Conferences and Workshops

Organizer:

1. Huawei Joint Conference on Quantum Technology: Academia Meets Industry, Shanghai, China, 21/09/2019 - 22/09/2019
2. 14th China-Singapore Joint Symposium on Research Frontiers in Physics, Shanghai, China, 24/09/2018- 26/09/2018
3. Shortcuts to Adiabaticity, Shanghai, China, 01/07/2014-03/07/2014
>50 invited and contributed talks (selected)
4. The 11th DYNAMICS DAY Asia-Pacif, Singapore, 16/11/2020-20/11/2020
5. Workshop QSLThermo19 on Quantum Speed Limit and Thermodynamics, Bilbao, Spain, 28/10/2019-31/10/2019
6. International Conference on Superlattices, Nanostructures and Nanodevices, 2018, Madrid, Spain 23/07/2018-28/09/2018
7. 24th Annual International Laser Physics Workshop, Shanghai, China, 21/08/2016-25/08/2016
8. Coherent Control of Complex Quantum Systems, Okinawa, Japan, 14/04/2014-17/04/2014
9. Correlations and Coherence in Quantum Systems, Évora, Portugal, 08/10/2012-12/10/2012
10. 16th International Conference on Narrow Gap Systems, Hangzhou, China, 02/08/2013-06/08/2013

C.7 Awards and recognitions

1. Editorial board for Scientific Report
2. Deputy Editor for Chinese Journal of Nature
3. Referees for Nature series, PRL, PRA, OL, OE and APL ect.
4. Reviewer for the projects supported from NSFC and STCSM.
5. Vice director of QuArtist at Shanghai University
6. Supervisor of 11 Ph.D students from Shanghai University
7. Teaches courses: Quantum Mechanics, and Introduction to Quantum Optics ect..