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## STAFF PROFILE

# Associate Professor Lan Wang

**Position:** Associate Professor of Physics

**College / Portfolio:** School of Science Cluster

**School / Department:** Physics

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**Campus:** Melbourne City Campus

**Contact me about:** Research supervision

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### Overview

Dr Lan Wang is an Associate Professor in the at RMIT University.

### Research fields

Our research fields focus on topological condensed matter systems, spintronics, and magnetic materials. We grow single crystals, thin films and nanostructures. Based on these materials, we fabricate devices for electron and spin transport measurements. We also collaborate with other research groups to investigate the optical properties of these novel materials and devices. Our aims are to understand the fundamental physics of these novel materials and devices and to fabricate the next generation prototype spintronic devices.

### Techniques for our research

#### Growth and characterization of materials

- i. Ultra high vacuum (UHV) systems and thin film deposition
- ii. Single crystal growth
- iii. Nanostructure growth

#### Device fabrication using E-beam and photo lithography

#### Characterization of electric and magnetic properties of materials

- i. Standard magnetic measurements
- ii. Measurements and analysis of the quantum oscillations of single crystalline systems in high magnetic field and low temperature
- iii. Point contact spectroscopy (Point contact Andreev reflection)

- iv. Gate tuned electric transport in nano-devices
- v. Measurements of magneto-electrical coupling effect

See Dr Lan Wang's [ResearcherID publications list \(http://www.researcherid.com/ezproxy.lib.rmit.edu.au/rid/B-6990-2011\)](http://www.researcherid.com/ezproxy.lib.rmit.edu.au/rid/B-6990-2011)

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## Qualifications

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- January 2006 Ph.D in Materials Sciences (University of Minnesota-twin cities?USA Advisor: Professor Chris Leighton)
- Aug 2001 Ph.D in Physics (National University of Singapore, Singapore Advisors?Professor Jun Ding and Professor Yuan Ping Feng)
- March 1997 Msc in theoretical physics at ZheJiang University, China
- Jun 1993 Bachelor of Science in Physics at ZheJiang University, China (Zhu Ke Zhen scholarship, the highest honour of ZheJiang University)

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## Industry Experience

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## Work experience

- 2014 – present Associate Professor, School of Applied Science, RMIT University
- 2006 – 2014 Assistant Professor, Division of Physics and Applied Physics, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore
- 2002 – 2003 Teaching Assistant, Department of Chemical Engineering and Materials Science, University of Minnesota - twin cities, USA
- 1997 – 1998 Clinic Assistant, Department of Radiation Oncology and Nuclear Medicine, Rush Presbyterian St Luke's Medical Center, Chicago, USA
- Mar - Aug 1997 Electric Engineer, XinDa Communication Solution Inc, China

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## Publications

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- Yue, Z.,Cai, B.,Wang, L.,Wang, X.,Gu, M. (2016). [Intrinsically core-shell plasmonic dielectric nanostructures with ultrahigh refractive index \(http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006064074\)](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006064074) In: *Science Advances*, 2, 1 - 8
- Sulaev, A.,Zhu, W.,Teo, K.,Wang, L. (2015). [Gate-tuned quantum oscillations of topological surface states in ?-Ag2Te \(http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006051910\)](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006051910) In: *Scientific Reports*, 5, 1 - 7
- Sulaev, A.,Zeng, M.,Shen, S.,Cho, S.,Zhu, W.,Feng, Y.,Eremeev, S.,Kawazoe, Y.,Shen, L.,Wang, L. (2015). [Electrically tunable in-plane anisotropic magnetoresistance in topological insulator BiSbTeSe2 nanodevices \(http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006051957\)](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006051957) In: *Nano Letters*, 15, 2061 - 2066
- Banerjee, K.,Besbas, J.,Ren, P.,Wang, L.,Yang, H. (2015). [Magnetic proximity effect in the topological insulator BiSbTeSe<inf>2</inf> \(http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006056371\)](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006056371) In: *Physica Status Solidi - Rapid Research Letters*, 9, 175 - 179
- Cheng, L.,La-o-vorakia, C.,Tang, C.,Nair, S.,Xia, B.,Wang, L.,Zhu, J.,Chia, E. (2014). [Temperature-dependent ultrafast carrier and phonon dynamics of topological insulator Bi1.5Sb0.5Te1.8Se1.2 \(http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006049929\)](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006049929) In: *Applied Physics Letters*, 104, 1 - 4
- Ou, J.,So, J.,Adamo, G.,Sulaev, A.,Wang, L.,Zheludev, N. (2014). [Ultraviolet and visible range plasmonics in the topological insulator Bi1.5Sb0.5Te1.8Se1.2 \(http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006049930\)](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006049930) In: *Nature Communications*, 5, 1 - 7

Banerjee, K., Son, J., Deorani, P., Ren, P., Wang, L., Yang, H. (2014). Defect-induced negative magnetoresistance and surface state robustness in the topological insulator BiSbTeS e2 ([http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006050002](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006050002)) In: *Physical Review B - Condensed Matter and Materials Physics*, 90, 1 - 5

Ho, H., Bai, K., Song, W., Teck, T., Zhao, R., Ng, C., Wang, L. (2013). Optical response characteristics arising from delocalized electrons in phase change materials ([http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006049935](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006049935)) In: *Acta Materialia*, 61, 1757 - 1763

Tang, C., Xia, B., Zou, X., Chen, S., Ou, H., Wang, L., Rusydi, A., Zhu, J., Chia, E. (2013). Terahertz conductivity of topological surface states in Bi 1.5 Sb 0.5 Te 1.8 Se 1.2 ([http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006049936](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006049936)) In: *Scientific Reports*, 3, 1 - 6

Ren, P., Cho, S., Liu, P., You, L., Zou, X., Wang, B., Wang, J., Wang, L. (2013). Temperature controlled c axis elongated low symmetry phase BiFeO 3 thin film on STO substrate ([http://researchbank.rmit.edu.au/list/?cat=quick\\_filter&form\\_name=adv\\_search&search\\_keys%5Bcore\\_66%5D=2006049938](http://researchbank.rmit.edu.au/list/?cat=quick_filter&form_name=adv_search&search_keys%5Bcore_66%5D=2006049938)) In: *AIP Advances*, 3, 1 - 6

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## Supervisor Projects

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**Note:** Supervision projects since 2004

2 PhD Current Supervisions and 1 Masters by Research Current Supervisions

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## Supervisor Interests

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Electron and spin transport in devices based on novel quantum materials, Topological insulators, Novel two dimensional semiconductors, Skyrmion systems

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## Grants

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ARC Centre of Excellence in Future Low-Energy Electronics Technologies (administered by Monash University). Funded by: *ARC Centre of Excellence via other university 2017 from (2017 to 2023)*

