

Mingda's Curriculum Vitae

Personal Particulars

Name: Mingda Li

Email: mingda@mit.edu

Phone: +1(617) 943-0658

Website: <http://engnano.mit.edu/>

Address: MIT Bldg. 7-034. 77 Massachusetts Ave, Cambridge, MA 02139

Employment

- Jan 2018 – Assistant Professor in Dept. of Nuclear Science & Engineering,
Massachusetts Institute of Technology (MIT)
- Sept 2015 – Dec 2017 Postdoctoral Associate, Dept. of Mechanical Engineering,
Massachusetts Institute of Technology (MIT)
Advisers: Prof. [Gang Chen](#) and
Late Institute Prof. [Mildred S Dresselhaus](#)

Education

- Aug 2009 – June 2015 PhD in Dept. of Nuclear Science & Engineering,
Massachusetts Institute of Technology (MIT)
Thesis Advisers: Prof. [Ju Li](#) and Dr. [Jagadeesh S. Moodera](#)
- Aug 2005 – June 2009 B.S. in Dept. of Engineering Physics, **Tsinghua University**, China

Research Interests

Materials defects; Nanoscale energy transport and conversion; Radiation-matter interaction; Spectroscopy development; Neutron, X-ray and electron spectroscopies; Energy security.

Publications (* As Corresponding Author)

Under Review

030. T-H Liu, J. Zhou, M. Li, Z. Ding, Q. Song, B. Liao, L. Fu and G. Chen*, "Spin-Orbit Coupling Mediated Electron Mean-Free-Path Filtering Effect for Improving Thermoelectric Properties in SnTe", submitted.
029. M. Li, and G. Chen, "Theory of electron-phonon-dislon interacting system", submitted.
028. [M. Li*](#), [Q. Song](#), W. Zhao, J. A. Garlow, T-H Liu, L. Wu, Y. Zhu, J. S. Moodera, M. H. W. Chan, G. Chen* and C-Z Chang*, "Dirac-Electrons-Mediated Magnetic Proximity Effect in Topological Insulator / Magnetic Insulator Heterostructures", [arXiv:1706.00847](https://arxiv.org/abs/1706.00847), submitted. (Equal contribution)
027. M. N. Luckyanova, J. Mendoza, H. Lu, S. Huang, J. Zhou, [M. Li](#), B. J. Kirby, A. Grutter, A. Puetzky, M. Dresselhaus, A. Gossard, and G. Chen*, "Phonon Heat-Conduction Localization", [arXiv:1602.05057](https://arxiv.org/abs/1602.05057), submitted.

Published & Accepted

026. M. Li*, Q. Song, T-H Liu, L. Meroueh, G. D. Mahan, M. S. Dresselhaus and G. Chen*, "Tailoring Superconductivity with Quantum Dislocations", accepted by Nano Lett (2017). [Nano Lett. 17, 4604 \(2017\)](#).
025. C. Fu, M. Li*, "Oscillative deviation from Matthiessen's rule due to interacting dislocations", [J. Phys. Condens. Matter 29, 325702 \(2017\)](#).
024. M. Li*, Z. Ding, Q. Meng, J. Zhou, Y. Zhu, H. Liu, M. S. Dresselhaus and G. Chen*,

“Nonperturbative Quantum Nature of the Dislocation-Phonon Interaction”, [Nano Lett. 17, 1587 \(2017\)](#).

- Highlight on [DOE Office of Science Homepage](#) and [MIT Homepage](#). Press Release on [MIT News](#), [Phys.org](#), etc.

023. W. Zhao, M. Li, C-Z Chang*, J. Jiang, L. Wu, C. Liu, Y. Zhu*, J. S. Moodera and M. H. W. Chan*, "Direct observation of transfer and superconducting pairing of electrons at the FeSe/SrTiO₃ interface", [arXiv:1701.03678](#). (Equal contribution)

022. M. Li*, W. Cui, M. S. Dresselhaus and G. Chen*, "Electron energy can oscillate near a crystal dislocation", [New J. Phys. 19, 013033 \(2017\)](#).

021. A. Vipin*, B. Fugetsu, I. Sakata, A. Isogai, M. Endo, M. Li, M. S. Dresselhaus, "Cellulose nanofiber backboned Prussian blue nanoparticles as powerful adsorbents for the selective elimination of radioactive cesium", [Sci. Rep. 6, 37009 \(2016\)](#).

020. Z. Zhu, M. Li and J. Li*, "Topological semimetal- topological insulator Quantum Phase Transition in Zintl compounds Ba₂X (X=Si, Ge)", [Phys. Rev. B 94, 155121 \(2016\)](#).

019. K-P So, D. Chen, A. Kushima, M. Li, S. Kim, Y. Yang, Z. Wang, J-G Park, Y-H Lee, R. I. Gonzalez, M. Kiwi, E. M. Bringa, S. Lin* and J. Li*, "Dispersion of carbon nanotubes in Aluminum improves radiation resistance", [Nano Energy 22, 319 \(2016\)](#).

- Press Release on [MIT NEWS](#), [Nanowerk](#), [eScienceNews](#), etc.

018. C-Z Chang* and M. Li, "Quantum Anomalous Hall Effect in Time-Reversal-Symmetry Breaking Topological Insulators", [J. Phys. Condens. Matter 28, 123002 \(2016\)](#).

- Invited Topical Review.

017. M. Li*, C. Chang*, B. J. Kirby, M. Jamer, W. Cui, L. Wu, P. Wei, Y. Zhu, D. Heiman, J. Li and J. S. Moodera*, "Proximity Driven Enhanced Magnetic Order at Ferromagnetic Insulator / Magnetic Topological Insulator Interface", [Phys. Rev. Lett. 115, 087201 \(2015\)](#).

- Press Release on [MIT News](#), [Phys.org](#), [SciTechDaily](#) etc.

016. M. Li*, C. Chang*, L. Wu, J. Tao, W. Zhao, M. Chan, J. S. Moodera, J. Li and Y. Zhu*, "Experimental Verification of the Van Vleck Nature of Long-Range Ferromagnetic Order in Vanadium-Doped Three-Dimensional Topological Insulator Sb₂Te₃". [Phys. Rev. Lett. 114, 146802 \(2015\)](#).

- Press Release on [BNL News](#), [BNL homepage](#), [ScienceDaily](#), [Phys.org](#), etc.

015. M. Li*, W. Cui, J. Yu, Z. Dai, Z. Wang, F. Katmis, W. Guo and J. Moodera, "Magnetic Proximity Effect and Interlayer Exchange Coupling of Ferromagnetic / Topological Insulator / Ferromagnetic Trilayer", [Phys. Rev. B 91, 014427 \(2015\)](#).

014. A. Ugur, F. Katmis, M. Li, L. Wu, Y. Zhu, K. Varanasi and K. Gleason*, " Low-Dimensional Conduction Mechanisms in Highly-Conductive and Transparent Conjugated Polymers", [Advanced Materials 31, 4604 \(2015\)](#).

- Press Release on [MIT news](#), [MIT homepage](#), [SciTechDaily](#) etc.

013. Z. Tian*, M. Li*, Z. Ren, H. Ma, A. Alatas, S. Wilson and J. Li, "Investigation of phonon transport in PbTe-PbSe alloys using inelastic x-ray scattering", [J. Phys. Condens. Matter. 27, 375403 \(2015\)](#).

012. M. Li*, W. Cui, L. Wu, Q. Meng, Y. Zhu, Y. Zhang, W. Liu and Z. Ren, "Topological Effect to Surface Plasmon Excitation in Topological Insulator Nanowires". [Can. J. Phys. 93, 591-598 \(2015\)](#).

011. M. Li*, Z. Dai, W. Cui, Z. Wang, F. Katmis, P. Le, J. Wang, L. Wu and Y. Zhu, "Tunable THz

Surface Plasmonics based on Topological Insulator-Layered Superconductor Hybrid Structure", [*Phys. Rev. B* **89**, 235432 \(2014\)](#).

010. Z. Wang, E. Fratini, M. Li, P. Le, E. Manontov, P. Baglioni, S-H Chen, "Hydration-dependent dynamic crossover phenomenon in protein hydration water", [*Phys. Rev. E* **90**, 042705 \(2014\)](#).

009. J. Niu, A. Kushima, M. Li, W. Li, Z. Wang and J. Li*, "Scalable Synthesis of Sulfur Nanosponge Cathode for Lithium-Sulfur Battery with Greatly Improved Cyclability", [*J. Mater. Chem. A* **2**, 19788-19796 \(2014\)](#).

008. W. Cui, M. Li*, Z. Dai, Q. Meng and Y. Zhu, "Near-Field Optical Effect of a Core-Shell Nanostructure in Proximity to a Flat Surface", [*J. Chem. Phys.* **140**, 044109 \(2014\)](#).

007. Z. Wang, W-S Chiang, P. Le, E. Fratini, M. Li, A. Alatas, P. Baglioni and S-H Chen*, "One role of hydration water in proteins: key to the 'softening' of short time intraprotein collective vibrations of a specific length scale", [*Soft Matter* **10**, 4298 \(2014\)](#).

006. Z. Wang, K-H Liu, P. Le, M. Li, W-S Chiang, J. Leao, M. Tyagi, J. Copley, A. Podlesnyak, A. I. Kolesnikov, C-Y Mou, and S-H Chen*, "Boson peak in deeply-cooled confined water: A possible way to explore the existence of the liquid-to-liquid transition in water", [*Phys. Rev. Lett.* **112**, 237802 \(2014\)](#).

005. A. D. Liao, M. Yao, F. Katmis, M. Li, S. Tang, J. Moodera, C. Opeil, and M. S. Dresselhaus, "Inducing Anisotropic Electronic Transport in Bismuth Thin Films", [*Appl. Phys. Lett.* **105**, 063114 \(2014\)](#).

004. S. Paltsev, F. O'Sullivan, N. Lee, A. Agarwal, M. Li, X. Li, N. Fylaktos (2013), "[Natural Gas Monetization Pathways for Cyprus: Interim Report - Economics of Project Development Options](#)", MIT Energy Initiative, Massachusetts Institute of Technology, Cambridge, MA. ISBN 978-0-9828008-8-1.

003. M. Li, X-Q Chu, E. Fratini, P. Baglioni, A. Alatas, E. E. Alp, S-H Chen*, "Phonon-like excitation in secondary and tertiary structure of hydrated protein powders", [*Soft Matter* **7**, 9848-9853 \(2011\)](#).

002. C-S Tsao, M. Li, Y. Zhang, J. B. Leao, W-S Chiang, T-Y Chung, Y-R Tzeng, M-S Yu, and S-H Chen*, "Probing the Room Temperature Spatial Distribution of Hydrogen in Nanoporous Carbon by Use of Small-Angle Neutron Scattering", [*J. Phys. Chem. C* **114**, 19895 \(2010\)](#).

001. C-S Tsao, Y. Liu, M. Li, Y. Zhang, J. B. Leao, H-W Chang, M-S Yu and S-H Chen*, "Neutron Scattering Methodology for Absolute Measurement of Room-Temperature Hydrogen Storage Capacity and Evidence for Spillover Effect in a Pt-Doped Activated Carbon", [*J. Phys. Chem. Lett.* **1**, 1569-1573 \(2010\)](#).

Invited Talks

T1. M. Li, Feb 05, 2015, "Spectroscopic Studies of A Magnetic Topological Insulator", Condensed-Matter Physics & Materials Science Seminar, Brookhaven National Lab.

T2. M. Li, Jun 11, 2015, "Investigation of Magnetic Interactions in Thermoelectric Topological Insulator Materials", DOE Energy Frontier Research Center (EFRC), Solid-State Solar Thermal Energy Conversion (S³TEC) Seminar.

T3. M. Li, Feb 03, 2016, "Radiation physics today for materials science tomorrow", 2016 Del Favero Doctoral Thesis Prize Lecture.

T4. M. Li, Apr 01, 2016, "Dislon- Quantum Journey of Crystal Dislocations", National Synchrotron Light Source- II Friday Lunchtime Seminar Series, Brookhaven National Lab.

T5. M. Li, Apr 07, 2017, "From materials defects to spectroscopies: a nanoscale insight

toward an energy efficient nuclear engineering”, seminar at Mechanical Engineering department, University of South Carolina.

Professional Services

Referee of *2D Materials*; *ACS Appl. Mater. Interfaces*; *Acta Materialia*; *Adv. Mat.*; *Appl. Sci.*; *Annu. Rev. Heat Transfer*; *Front. Phys.*; *IEEE Trans. Magn.*; *Joule*; *J. Phys.: Condens. Matter*; *J. Phys. D: Appl. Phys.*; *J. Stat. Phys.*; *Nanoscale*; *Nano Lett.*; *Nano Energy*; *New J. Phys.*; *NPJ Compu. Mats.*; *Phys. Rev. B*; *Phys. Rev. Lett.*; *Quant. Info. Proc.*; *Sci. Rep.*

Teaching Assistant Experiences

2017, MIT EdTech Teaching Certificate Program (ETCP).

2016, MIT Kaufman Teaching Certificate Program (KTCP).

TA Subject No.*	Subject Level	Subject Name	Instructor(s)
22.11	G	Applied Nuclear Physics	Prof. B. Yildiz
22.12	G	Radiation Interactions, Control and Measurement	Prof. D. Whyte Prof. A. Danagoulian
22.15	G	Essential Numerical Methods	Prof. I. Hutchinson
22.02	U	Introduction to Applied Nuclear Physics	Prof. J. Li
3.014	U	Materials Laboratory	Prof. L. Hobbs Prof. L. Kimerling
22.02 (2-semesters)	U	Introduction to Applied Nuclear Physics	Prof. P. Cappellaro

*All courses are participated as full time Teaching Assistant.

Curriculum at MIT (GPA: 4.93/5.00)

Subject No.	Subject Full Name	Instructor	Grade
2.391	Nanostructure Fabrication	Prof. K. Berggren	A
2.57	Nano-to-Macro Transport Processes	Prof. G. Chen	A
3.34	Imaging of Materials	Prof. S. Gradecak	A
3.60	Symmetry, Structure and Tensor Properties of Materials	Prof. E. Fitzgerald	A
8.322	Quantum Theory II	Prof. R. Jackiw	A
8.323	Relativistic Quantum Field Theory I	Prof. W. Taylor	A
8.324	Relativistic Quantum Field Theory II	Prof. H. Liu	A
8.333	Statistical Mechanics I	Prof. M. Kardar	A
8.511	Theory of Solids I	Prof. P. A. Lee	A
8.512	Theory of Solids II	Prof. P. A. Lee	A
8.821	String Theory and Holographic Duality	Prof. H. Liu	A
22.51	Quantum Theory of Radiation Interactions	Prof. P. Cappellaro	A
22.101	Applied Nuclear Physics	Prof. B. Yildiz	B
22.105	Electromagnetic Interactions	Prof. D. Whyte	A
22.107	Computational Science and Engineering	Prof. J. Li	A

*Doctoral Qualifying Exam passed as the only first year graduate student of that year.

*Member of Alpha Nu Sigma Honor Society.

Selected Honors and Awards

2016, [Del Favero Prize](#) (awarded annually to a PhD graduate in NSE whose thesis is judged to have made the most innovative advance in the field related to nuclear sciences and engineering).

2015, Outstanding Teaching Assistant Award, MIT.

2015, Outstanding Grader of the Year Award, American Nuclear Society Student Section of MIT.

2011, Best Presentation Award, 13th National School on Neutron & X-Ray Scattering, Argonne National Laboratory and Oak Ridge National Laboratory.

2008, Meritorious Winner in 24th US Mathematical Contest in Modeling (MCM).