# BENJAMIN K CHANG

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Chinese Name: 張光遠 (Chang, Kuang-Yuan)

## EDUCATION

**California Institute of Technology**, Pasadena, CA, USA — Begins in Fall 2018
Ph.D. in Applied Physics

**National Taiwan University (NTU)**, Taipei, Taiwan — Sep. 2015 - June. 2017
M.S. in Physics
Advisor: Prof. Mei-Yin Chou
Thesis: First-Principles Studies of Cubic Sb-Doped GeTe Compounds for Thermoelectric Applications

**National Tsing Hua University (NTHU)**, Hsinchu, Taiwan — Sep. 2011 - June. 2015
B.S. in Program of Physics and in Program of Materials Science
Minor in Computer Science

## COMPUTING & PROGRAMMING SKILLS

| | |
|---|---|
| **Areas** | First-Principles Computation, Machine Learning |
| **Languages** | C/C++, Python, Shell Script, PHP, SQL, Javascript, LabVIEW, MATLAB |

## PUBLICATIONS

· Benjamin K. Chang and Mei-Yin Chou. Realizing High Thermoelectric Performance in Cubic GeTe via Sb-Doping: A First-Prinicples Study. In submission.

· Deniz P. Wong, Masoud Aminzare, Chin-Sheng Pang, Benjamin K. Chang, Hsiang-Ting Lien, Sun-Tang Chang, Chia-Hua Chien, Yang-Yuan Chen, Ming-Wen Chu, Yaw-Wen Yang, Wen-Pin Hsieh, Gerda Rogl, Peter Rogl, Mei-Yin Chou, Li-Chyong Chen, and Kuei-Hsien Chen. Boosting zT above 2.5: Temperature-Induced Valence Band Convergence in GeTe-rich Ge-Sb-Te Thin Film. In submission.

## WORK EXPERIENCE (RESEARCH/TEACHING)

RA, IAMS, Academia Sinica — Part-Time: Feb. 2016 - Jul. 2017 ‖ Full-Time: Aug. 2017 - Jul. 2018
TA, Classical Mechanics (Graduate Level), Department of Physics, NTU — Sep. 2016 - Jan. 2017
TA, Quantum Physics (Undergrad Level), Department of Physics, NTU — Sep. 2016 - Jan. 2017

## HONORS & AWARDS

· Gold Prize, Young Fellow Research Presentation Contest, *IAMS, Academia Sinica* — Nov. 2017
· Dean's Award, *College of Science, NTU* — Aug. 2017
· Phi Tau Phi Honorary Membership, *Phi Tau Phi Scholastic Honor Society* — Jun. 2016
· Elite Student Award, *College of Science, NTHU* — Apr. 2015
· Academic Achievement Award (2 times), *NTHU* — 2013 - 2014
· Yu Kuo-Hua Scholarship, *Yu Kuo-Hua Foundation* — Dec. 2013
· Chun-Tsung Scholar, *Chun-Tsung Chinese Undergraduate Research Endowment* — Nov. 2013
· Dr. Chen Ke-Zhong Memorial Scholarship, *NTHU* — Oct. 2013
· Student Award, *Interdisciplinary Program of Sciences, NTHU* — Nov. 2012

## RESEARCH PROJECTS

*Institute of Atomic and Molecular Sciences, Academia Sinica, Taiwan (PI: Prof. Mei-Yin Chou)*

**Sb-Doped GeTe as a Thermoelectric (Computational Study)** 2016 - 2018

- Collaborated with Prof. Kuei-Hsien Chen's experimental group at IAMS.
- Showed that Sb-doping can stabilize the cubic-phase GeTe and induce superior thermoelectric property.
- Predicted that the choice of substrate used in the experiments affects the resulting thermoelectric performance of cubic Ge-Sb-Te samples. Later confirmed by experiments.
- Two papers on their way.

**Size Effect in Cu Nanowires (Computational Study)** 2017 - 2018

- Collaborated with Prof. King-Ning Tu's experimental group at NCTU and TSMC.
- Found no significant quantum confinement effect in Cu nanowires, which facilitated the experimental process.

**Thermal Conductivity of Cmcm-SnSe (Computational Study)** 2017

- Collaborated with a Ph.D. student at Georgia Tech.
- Used a machine learning method — compressive sensing — with nearly 10,000 atomic displacement data derived from first-principles, and identified the large anharmonic force constants of Cmcm-SnSe.

*Department of Physics, Fudan University, Shanghai, China (PI: Prof. Jian Shen)*

**Giant Magnetoresistance of Organic Spin Valves (Experimental Study)** 2013

- Assisted the growth of Co/$Alq_3$/LSMO film using molecular beam epitaxy.
- Implemented a user-friendly monitor program.
- This work was finalized and published by the group in *Nature Communications* **5**:4396 (2014).

## RELEVANT COURSES

| **Physical Science** | **Mathematical & Computer Science** |
|---|---|
| Quantum Mechanics* | Calculus |
| Thermal Physics & Statistical Mechanics* | Statistics (& Probability) |
| Electromagnetism* | Linear Algebra |
| Classical Mechanics* | Applied Mathematics (for Physicists) |
| Particle Physics | Algorithms |
| Materials Science & Engineering | Data Structures |
| Crystal Structure & Diffraction Theory | Scientific Computing |
| Diffusion and Phase Transformation in Materials | Machine Learning & Deep Learning (Coursera) |

(Graduate level courses are labeled with *)

Last updated: September 13, 2018