

CURRICULUM VITAE

Jian He

◆ EDUCATION:

📖 1998-2004: Department of Physics and Astronomy, the University of Tennessee, Knoxville. Ph.D.
Advisors: Dr. D. G. Mandrus and Dr. E. W. Plummer.

PhD thesis: Metallic “Ferroelectricity” and Superconductivity in Transition Metal Oxide Pyrochlore $\text{Cd}_2\text{Re}_2\text{O}_7$ ”.

📖 1987-1991, Department of Physics, Jilin University, Changchun, Jilin, P.R. China.
Bachelor of Science.

Majoring in Condensed Matter Physics
Academic Advisor: Prof. L.W. Zeng
Graduation Project: “Optimal Preparations and Structural Study of High T_c TlBaCaCuO Superconductors”.

◆ PROFESSIONAL HISTORY:

📖 01/2008-present, Assistant Professor, Department of Physics and Astronomy, Clemson University.

Transition Metal Oxides and Energy-related Materials: Crystal Growth and Characterizations.

📖 09/2004-12/2007, Postdoctoral Research Associate, Department of Physics and Astronomy, Clemson University.

Bulk and Nano Thermoelectric Materials: Synthesis and Characterizations.
Supervisor; Prof. Terry. M. Tritt.

📖 07/1998-09/2004, Graduate Researching Assistant,
Department of Physics and Astronomy, the University of Tennessee, Knoxville
and Condensed Matter Sciences Division, Oak Ridge National Laboratory,
Department of Energy.

📖 07/1991-07/1998, Practice Research Fellow and Assistant Research Professor,
Thermal Neutron Scattering Laboratory, China Institute of Atomic Energy (CIAE),
Beijing, P.R. China.

Small Angle and Powder Neutron/X-ray Scattering.
Supervisors: Prof. T. H. Yang and Prof. C. T. Ye.

Workshops and Training Courses:

- (1) Workshop on Utilization of Research Reactor and Training Course on Neutron Techniques, sponsored by International Agency of Atomic Energy (IAEA) and China Academy of Science, Beijing, P.R. China, 1991.
- (2) Training Courses on Neutron Scattering, Neutron Activation Analysis and Neutron Imaging, sponsored by IAEA in Sydney, Australia, 1993. Certificate.
- (3) Workshop on Neutron Scattering in Asian and Pan-pacific Countries, sponsored by Science and Technology Agency of Japan and Indonesian Agency of Atomic Energy, Jakarta, Indonesia, 1995.
- (4) National Summer School on Neutron and X-ray Scattering, sponsored by Argonne National Lab and Department of Energy, Chicago, USA, 2003, certificate.

Presentations:

- (1) "Small Angle Neutron Scattering at China Institute of Atomic Energy", at "Regional Workshop on Utilities of Research Reactor", Sydney, Australia, 1993.
- (2) "The Status and Development of Neutron Techniques at China Institute of Atomic Energy", Jakarta, Indonesia, 1995.
- (3) "Crystal Growth and Transport Properties of β' - $\text{Cu}_x\text{V}_2\text{O}_5$ ", at APS March Meeting, Seattle, WA, 2001. Bull. Amer. Phys. Soc., 46(1), 1061, 2001.
- (4) "Crystal Growth and Characterization of VSe_{2-x} ", APS March Meeting, Indianapolis, IN, 2002. Bull. Amer. Phys. Soc., 47(1), 749, 2002.
- (5) "Crystal Growth, Transport and Specific Heat of $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ", APS March meeting, Austin, TX, 2003. Bull. Amer. Phys. Soc., 48(1), 1116, 2003.
- (6) "CrSb₂: A Spin=1/2 Heisenberg Chain?" APS March meeting, Montreal, Canada, 2004.
- (7) "Thermoelectric Study on Polycrystalline (La,Sr)RuO₃", MRS Fall meeting in Boston, MA, 2005.
- (8) "Glasslike Heat Conduction, Electron-Hole Scattering and Ionic Fluctuation in the Pyrochlore Superconductor $\text{Cd}_2\text{Re}_2\text{O}_7$ ", invited talk at Conference of Materials Science & Technology, Cincinnati, OH, Oct. 17, 2006.
- (9) Seminar given at the University of Kentucky, Lexington, KY, Mar. 13, 2007.
- (10) "New Opportunities in Existing Thermoelectric Materials: Grain Boundary Engineering in Pulverized p - Bi_2Te_3 ", invited talk at MRS Fall meeting, Boston, MA, Nov. 26, 2007.
- (11) "Overview of Nanocomposite Thermoelectric Materials", American Society of Mechanical Engineering meeting, Boston, MA, Nov. 3, 2008.
- (12) Invited talk to be given at the MRS Spring meeting, San Francisco, CA, April 2009.

Other > 15 contributed presentations.

◆ **Peer Reviewed Publications:**

(1991-1998)

- (1) “A Matrix Correction to the Collimator Distortion Caused by Triple Slit System in Small Angle Neutron Scattering”, **J. He** and T. H. Yang, Acta Sinica Physics, Vol.45, No.6, June 1996.
- (2) “The Association Effect of the Human/Bovine Serum Albumin under Different Cationic Concentration “, **J. He**, Y. Q. Zhou, J.T. He, Y.P. Xu and T. H. Yang, Journal of the China Nuclear Energy Science and Technology, Vol.30, No.1 February, 1996.
- (3) “The inter-particle interference Effect in Small Angle Neutron Scattering”, Journal of the China Nuclear Science and Technology, rapid communication, **J. He** and T. H. Yang, Vol.35, No.1, Feb. 1997 and regular paper in Vol.40, No.1, Feb. 1998.

(2002-2004)

- (4) “Fluctuation Effect of the Physical Properties of $\text{Cd}_2\text{Re}_2\text{O}_7$ Near 200K”, J. of Phys.: Condens. Matt., R. Jin, **J. He**, J. Thompson, M. Chisholm, B. Sales and D. Mandrus, 14 No.5, L117 (2002).
- (5) “Superconductivity in the Correlated Pyrochlore $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, R. Jin, **J. He**, J. Thompson, M. Chisholm, B. Sales and D. Mandrus, Phys. Rev. B, Vol. 64, R180503, (2001).
- (6) “Structural Ordering and Symmetry Breaking in $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, J. Castellan, B. Gaulin, J. Duijn, M. Lewis, M. Lumsden, R. Jin, **J. He**, S. Nagler and D. Mandrus, Phys. Rev. B, Vol. 66, 134528 (2002).
- (7) “Temperature Dependence of the Magnetic Penetration Depth in the Vortex State of the Pyrochlore Superconductor $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, M. Lumsden, S. Dunsiger, J. Sonier, R. Miller, R. Kiefl, R. Jin, **J. He**, D. Mandrus, S. Bramwell and J. Gardner, Phys. Rev. Lett., Vol.89, No.14, 147002 (2003).
- (8) “Site-Selected O-2p densities of States in NaV_2O_5 determined from Angular Dependent X-ray Absorption and Emission Spectra”, G. Woods, G. Zhang, T. Callcott, L. Lin, M. Chang, B. Sales, D. Mandrus and **J. He**, Phys. Rev. B, Vol. 65, 165108 (2002).
- (9) “Electron Correlation Effects in Resonant Inelastic X-ray Scattering of NaV_2O_5 ”, G. Zhang, T. Callcott, G. Woods, L. Lin, B. Sales, D. Mandrus and **J. He**, Phys. Rev. Lett. 88,77401 (2002).
- (10) “Orbital-resolved Soft X-ray Spectroscopy in NaV_2O_5 ”, G.P. Zhang, G. Woods, E. Shirley, T. Callcott, L. Lin, G. Chang, B. Sales, D. Mandrus and **J. He**, Phys. Rev. B 65, 165107 (2002).
- (11) “Optical evidence for Mass Enhancement of Quasiparticles in Pyrochlore $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, N. Wang, J. McGuire, T. Timusk, R. Jin, **J. He** and D. Mandrus, Phys. Rev. B, 66, 014534 (2002).
- (12) “Electrical Properties of $\text{Cd}_2\text{Re}_2\text{O}_7$ under Pressure”, N. Barisic, L. Forro, D.

- Mandrus, R. Jin, **J. He** and P. Fazekas, Phys. Rev. B 67, 245112 (2003).
- (13) “Probing the Localization Effect in $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ Purple Bronze; An Optical Properties Study”, J. Choi, J. Woodward, J. Musfeldt, **J. He**, R. Jin, J. Thompson, D. Mandrus, X. Lin, V. Bondarenko and J. Brill, Phys. Rev. B, 69, 085120 (2004).
- (14) “Metallic “Ferroelectricity” in the Pyrochlore $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, I. Sergienko, V. Keppens, M. McGuire, R. Jin, **J. He**, S. Curnoe, B. Sales, P. Blaha, D. Singh, K. Schwarz, and D. Mandrus, Phys. Rev. Lett. 92, 165501 (2004).
- (15) “Luttinger Liquid APRES line Shape from Samples of $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ Grown by the Temperature Gradient Flux Technique”, G. Gweon, S. Mo, J. Allen, **J. He**, R. Jin, D. Mandrus and H. Hochst, Phys. Rev. B 70, 153103 (2004).
- (16) “Magneto-optical Properties of $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$: Color Change in Applied Magnetic Field”, J. Choi, J. Woodward, J. Musfeldt, X. Wei, M. Whangbo, **J. He**, R. Jin and D. Mandrus, Phys. Rev. B 085107 (2004).
- (17) “Electrical, Magnetic and Thermal properties of Metallic Copper Vanadium Bronze β' - $\text{Cu}_{0.66}\text{V}_2\text{O}_5$ ”, **J. He**, R. Jin, M. Chisholm and D. Mandrus, in preparation.
- (18) “An Imperfection-Driven Phase Transition at 120 K in $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, C. Lu, R. Jin, H. Qu, **J. He**, D. Mandrus, K. Tsuei, C. Tzeng, L. Lin, E. W. Plummer and J. Zhang, Phys. Rev. B 70, 092506 (2004).

(2005-2007)

- (19) “Growth and Characterization of 1-D Bi_2Te_3 Nanowires”, M. Craps, N. Gothard, R. Rao, **J. He**, J. Hudson, Terry M. Tritt and A.M. Rao, MRS Sym. Proc., 886, 109 (2006).
- (20) “Crystal Growth, Structure and Stoichiometry of the Superconducting Pyrochlore $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, **J. He**, R. Jin, B. Chakoumakos, B. Sales and D. G. Mandrus, J. Elec. Mater., 36, 740 (2007).
- (21) “Goldstone-Mode Phonon Dynamics in the Pyrochlore $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, C. Kenziora, I. Sergienko, R. Jin, **J. He**, V. Keppens, B.C. Sales and D. Mandrus, Phys. Rev. Lett., 95, 125503 (2005).
- (22) “Non-Fermi Liquid Behavior in Quasi-One-Dimensional $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ”, J. Hager, R. Matzdorf, **J. He**, R. Jin, D. Mandrus, M. A. Cazalilla and E. W. Plummer, Phys. Rev. Lett., 95, 186402 (2005).
- (23) “ μSR study on Lithium purple bronze $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ”, J. Chakhalian, Z. Salman, J. Brewer, A. Froese, **J. He**, D. Mandrus and R. Jin, *Physica B*, 359, 1333 (2005).
- (24) “Chemical Vapor Deposition Growth of PbTe Nano-particles”, B. Zhang, **J. He**, A. M. Rao and T. Tritt, Appl. Phys. Lett. 88, 043119 (2006).
- (25) “Nonlinear optical evidence for broken inversion symmetry in $\text{Cd}_2\text{Re}_2\text{O}_7$ ”, J.C. Petersen, J.S. Dodge, M.D. Caswell, I. Sergienko, **J. He**, R. Jin and D. Mandrus, Nature Physics, Vol.2, Issue 9, 605 (2006).
- (26) “Thermoelectric Study on Polycrystalline $\text{La}_{1-x}\text{Sr}_x\text{RuO}_3$ ”, **J. He**, D. Thompson, B. Edwards and Terry M. Tritt, MRS Sym. Proc., 886, 75 (2008).
- (27) “New Luttinger Liquid Physics from Photoemission on $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ”, F. Wang, J. V. Alvarez, S.-K. Mo, J. W. Allen, G.-H. Gweon, **J. He**, R. Jin, D. Mandrus and H. Hochst, Phys. Rev. Lett. 196403 (2006).
- (28) “Thermal Conductivity of CoSb_3 Grown via a Solvothermal Treatment Technique”,

- X. Ji, **J. He**, Z. Su, P. Alboni, N. Gothard, B. Zhang and Terry M. Tritt, Rapid Research letter, *Physica Solidi Status*, 1, 6, 229 (2007).
- (29) “Thermoelectric and Transport Properties of n-BiTe Nanocomposites”, N. Gothard, X. Ji, **J. He** and Terry M. Tritt, *J. Appl. Phys*, 103, 054314 (2008). Also selected to the February 2008 issue of *Virtual Journal of Nanoscale Science&Technology*.
- (30) “Controlled Two-dimensional Nanostructures for Bulk Thermoelectric Composites”, B. Zhang, **J. He**, X. Ji, Terry M. Tritt and A. Kumbhar, *Appl. Phys. Lett.* 89, 163114 (2006). Also selected to the October 30, 2006 issue of *Virtual Journal of Nanoscale Science & Technology*.
- (31) “Laser-assisted Synthesis and Optical Properties of Bismuth nanorods”, J. Reppert, R. Rao, M. Skove, **J. He**, M. Craps, Terry M. Tritt and Apparao M. Rao, *J. Chem. Phys. Solids*, 442, 334 (2007).
- (32) “Thermal Conductivity of CoSb₃ Grown via a Solvothermal Treatment Technique”, X. Ji, **J. He**, P. Alboni, Z. Su, N. Gothard, B. Zhang, Terry M. Tritt and J. W. Kolis, *Physica Solidi Status* 1 (6), 229 (2007).
- (33) “Thermoelectric Properties of Mo₃Sb_{5.4}Te_{1.6} and Ni_{0.06}Mo₃Sb_{5.4}Te_{1.6}”, H. Zhang, **J. He**, B. Zhang, Z. Su, Terry M. Tritt, N. Soheilnia and H. Kleinke, *J. Elec. Materials*, 36, 727 (2007).
- (34) “Naturally Occurring and Stress Induced Tubular Structures from Mammalian Cells, a Survival Mechanism”, Y. Wu, R.C. Laughlin, D.C. Henry, D.E. Krueger, J.S. Hudson, C-Y Kuan, **J. He**, J. Reppert and J.P. Tomkins, *BioMed Central Editorial, Cell Biology*, 8:36 (2007).
- (35) “Solution-chemical Synthesis of Nano-structured Bi₂Te₃ and PbTe Thermoelectric Materials”, X. Ji, **J. He**, B. Zhang and Terry M. Tritt, *J. Elec. Materials*, 36, 721 (2007).

(2008-April 2009)

- (36) “New Luttinger-liquid Physics from Angle Resolved Photoemission on a Paradigm Material”, F. Wang, J. V. Alvarez, J. W. Allen, **J. He**, D. Mandrus, R. Jin, and H. Hochst, *Physica B: Cond. Matt.*, 403, 1490 (2008).
- (37) “The Role of γ -Iron Nanoparticulates in the Growth of Carbon Nanotubes (CNTs)”, A. Khasanov, **J. He**, K. Yang, J. Gillard, A. Nath and A. Rao, *Appl. Phys. Lett.*, 93, 013103 (2008).
- (38) “Single Crystal Growth of Na_xCo₂O₄ via a Novel Low Temperature Flux Method”, X. Tang, **J. He**, Ed Abbot, A. Kevin, J. K. Kolis and Terry M. Tritt, *J. Crys. Growth*, 310, 3, 665 (2007).
- (39) “Thermoelectric Properties of n-type Mg₂Si_{0.6-y}Sb_ySn_{0.4} Compounds”, Q. Zhang, H. Yin, T. J. Zhu, X.B. Zhao, **J. He**, X. Ji and T. M. Tritt, *Phys. Stat. Soli. (a)*, 205, 7, 1657 (2008).
- (40) “Determination of In-plane Thermal Conductivity of Na_xCo₂O₄ via a Parallel Thermal Conduction Technique”, X.F. Tang, K. Aaron, **J. He** and Terry M. Tritt, *Phys. Stat. Sol. A*, 205,5, 1152 (2008).
- (41) “Thermoelectric Properties of YbZn_{2-x}Mn_xSb₂ (0≤x≤0.4) Solid Solutions”, C. Yu, T. J. Zhu, **J. He**, Z. Su, X. H. Ji, X. B. Zhao and Terry M. Tritt, *J. Appl. Phys.*, 104, 013705 (2008).

- (42) "Nanostructures in High-performance $(\text{GeTe})_x(\text{AgSbTe}_2)_{100-x}$ Thermoelectric Materials", S.H. Yang, T. J. Zhu, T. Sun, **J. He**, S.N. Zhang and X. B. Zhao, *Nanotechnology* 19, 245707 (2008).
- (43) "Thermoelectric Properties of $\text{La}_{0.9}\text{CoFe}_3\text{Sb}_{12}\text{-CoSb}_3$ Skutterudite Nanocomposites", P.N. Alboni, X. Ji, **J. He**, N. Gothard and Terry M. Tritt, *J. Appl. Physics*, 103, 113207 (2008).
- (44) "First Principles Study of the Electronic, Optical and Lattice Vibrational Properties of AgSbTe_2 ", Lin-Hui Ye, Khang Hoang, A. J. Freeman, S.D.Mahanti, **J. He**, Terry M. Tritt and M.G.Kanatzidis, *Phys. Rev. B*, 77, 245203 (2008).
- (45) "In Situ Peritectic Growth and La-doping Study of Effect of $\text{Mg}_2(\text{Si},\text{Sn})$ Thermoelectric Composites", Q. Zhang, **J. He**, X.B. Zhao, J. He, S. N. Zhang, T. J. Zhu, H. Yin, Terry. M. Tritt, *J. Phys. D* 41, 185103 (2008).
- (46) "Thermoelectric Properties of (In,Yb) Double-filled CoSb_3 Skutterudite", J.Y. Peng, P. N. Alboni, **J. He**, Z. Su, B. Zhang, T. Holgate, N. Gothard and Terry M. Tritt, *J. Appl. Phys.* 104, 053710 (2008).
- (47) "High Figures of Merit and Natural Nanostructures in $\text{Mg}_2\text{Si}_{0.4}\text{Sn}_{0.6}$ based Thermoelectric Materials", Q. Zhang, **J. He**, T. J. Zhu, S. N. Zhang, X. B. Zhao and Terry M. Tritt, *Appl. Phys. Lett.* 93, 102109 (2008).
- (48) "Improved thermoelectric performance in polycrystalline p-type Bi_2Te_3 via an alkali metal salt hydrothermal nanocoating treatment approach", X. Ji, **J. He**, Z. Su, N. Gothard and Terry M. Tritt, *J. Appl. Phys.*, 104, 034907 (2008).
- (49) "New Opportunities in Existing Thermoelectric Materials: Grain Boundary Engineering in Pulverized p- Bi_2Te_3 ", *invited paper*, **J. He**, X. Ji, Z Su, N. Gothard, J. Edwards and Terry M. Tritt, *MRS Sym. Proc.*, 1044, 21 (2008).
- (50) "Thermoelectric Nanocomposites: a New Paradigm", S. N. Zhang and **J. He**, *Journal of South Carolina Academy of Science*, 6(2), 14 (2008).
- (51) "Thermal Conductivity and Specific Heat of Bulk Amorphous Chalcogenides $\text{Ge}_{20}\text{Te}_{80-x}\text{Se}_x$ ($x = 0,1,2,8$)", S. N. Zhang, **J. He**, T. J. Zhu, X. B. Zhao, and Terry M. Tritt, *J. non-Cryst. Solids*, 355, 79 (2009).
- (52) "Nanoscale Granular Boundaries in Polycrystalline $\text{Pb}_{0.75}\text{Sn}_{0.25}\text{Te}$: an Innovative Approach to Enhance the Thermoelectric Figure of Merit", X. Ji, B. Zhang, Z. Su, T. Holgate, **J. He**, and Terry M. Tritt, *Phys. Stat. Sol. A*, 206, 2, 221(2009).
The Editor's choice and cover picture.
- (53) "High-performance Half-Heusler Thermoelectric Materials $\text{Hf}_{1-x}\text{Zr}_x\text{NiSn}_{1-y}\text{Sb}_y$ Prepared by Levitation Melting and Spark Plasma Sintering", C. Yu, T.-J. Zhu, R.-Z. Shi, Y. Zhang, X.-B. Zhao and **J. He**, *Acta. Mater.*, (*in press*).
- (54) "High Temperature Thermoelectric Properties of Double-filled $\text{In}_x\text{Yb}_y\text{Co}_4\text{Sb}_{12}$ Skutterudites", J. Peng, **J. He**, Z. Su, P. N. Alboni and Terry M. Tritt, *J. Appl. Phys.*, (*in press*).

Book chapter, "Thermal-to-Electrical Energy Conversion from the Nanotechnology Perspective", **J. He** and Terry M. Tritt, the hand book entitled "Nanotechnology for the Energy Challenge" edited by Javier Garcia Martinez, John Wiley & Sons Publishing Inc. (*in press*)

◆ PATENTS

- (1) High Yield Convective Flow CVD (Chemical Vapor Deposition) Growth of Nano Particles, Terry M. Tritt, B. Zhang and **J. He**, Ser # 12/066310, filed on 03/10/2008.
- (2) Hydrothermal Coating of Nanometers Thick Coating on Larger nanoparticles or Grains, Terry M. Tritt, **J. He**, X. Ji, N. Gothard, P. Alboni and B. Zhang, Ser # 12/186811, filed on 08/06/2008.
- (3) Alkaline-Hydrothermal Treated p-type Bi_2Te_3 : Figure of Merit, Compatibility and Cost-effective Analysis, Terry M. Tritt, **J. He**, X. Ji, N. Gothard and Z. Su, under review.
- (4) In Situ Fabrication of $\text{Mg}_2(\text{Si},\text{Sn})$ Nanocomposite Thermoelectric Materials, X.B. Zhao, Q. Zhang, **J. He**, S.N. Zhang, T. J. Zhu and Terry M. Tritt, Ser # 200810059853.7 and 200810059852.2, filed on ~ 02/22/2008.