

RÉSUMÉ

Personal Data

Zewu Yan

Gumpenwisenstrasse 7, 8166 Niederweningen, Switzerland

Tel. No.: +41 44 633 2059 (O)

Email: zyan@phys.ethz.ch (work)

Email: zewuyan1@gmail.com (personal)

Education

- 11/2007—**Doctor of Philosophy in Science**
School of Physics, University of Western Australia, Perth, Australia
- 07/2002 —**Master of Engineering in Materials Engineering**
Wuhan University of Technology, Wuhan, China
- 07/1989—**Bachelor of Science in Materials Physics**
University of Science and Technology (BUST), Beijing, China

Honors and Awards

- Special Award for Best Final Year Thesis (1988), BUST
- First Prize for Best Student in final year studies (1988), BUST
- Special Award for Outstanding Extra Curriculum Performances (1987), BUST
- First Prize for Best Student in third year studies (1987), BUST
- Third Prize for Excellent Student in second year studies (1986), BUST

Work History

1. **Neutron Scattering and Magnetism Group, Laboratorium für Festkörperphysik, ETH Zürich**

03/2016—present: Technical Specialist

- Task and responsibilities: Synthesis, growth technique development and crystal growth of large samples of novel correlated-electron materials for neutron scattering experiments.
- Experience: Floating zone technique, flux method, micro-pulling-down technique, Czochralski and Bridgman methods, chemical vapor deposition and hydrothermal autoclave techniques.
- Detailed crystallographic characterization of samples using XRD and other methods.

2. Materials Sciences Division, Lawrence Berkeley National Laboratory

04/2008–03/2016: Project Scientist/Engineer

- My main activity in the laboratory has been to work toward the successful establishment of one of the largest crystal growth research laboratories in the US. In this new lab, different crystal growth techniques (from conventional techniques such as Czochralski, Bridgman and floating zone to novel techniques such as the micro-pulling-down method), and different material characteristic instruments (such as the X-ray powder diffraction, thermal analysis DTA and the reflection X-ray fluorescence spectrometer) have been installed and tested for reliability. This involved specifying, calibrating, testing and commissioning of all the equipment.
- Supervise postdocs and students in the Laboratory on a daily basis: mainly instruct them how to develop techniques of growth of their crystals, check that they work safely and train them on crystal growth equipment.
- Growing crystals for the Quantum Materials program funded by DOE/BES.
 - (1) Collaborated with CONCEPT Research Group, Department of Materials Science and Engineering in UC Berkeley to study materials, such as ErMnO_3 , BiVO_4 , BiFeO_3 and $\text{Y}_2\text{Ti}_2\text{O}_7$. The availability of crystals has made a number of studies of new materials' properties possible.
 - (2) Collaborated with Department of Materials Science and Engineering, Norwegian University of Science and Technology to study the domain wall properties of undoped and doped ErMnO_3 and DyMnO_3 .
 - (3) Collaborated with the Joint Center for Artificial Photosynthesis (JCAP) to grow doped BiVO_4 for the development of an artificial solar-fuel generation technology.
- Synthesis of new chemical compounds by the solid state reaction method and high temperature melting reaction method.
- To do routine management of the crystal growth lab to keep all facilities working properly
- Research on 2 large projects and meet the strict deadlines:
 - (1) "Crystal growth of detector materials," funded by DOE/NNSA/NA22
 - (2) "High throughput discovery of scintillator materials," funded by DHS/DNDO

2. School of Physics, University of Western Australia

07/2006–03/2008: Tutor and Demonstrator

- Advanced Physics A (PH 1101)
- Physics (PH 1102)
- Second year physics experiments

01/2003–06/2006: Visiting Academic and PhD Study

- Laser scattering study of synthetic sapphire crystals

- Designing a computer control system to map inhomogeneities in large-size crystals automatically (Visual Basic® program and Matlab® software)
- Study thermal lensing in mirror by using Hartmann sensor

Training Courses in UWA:

- (1) Completed certificate for Microscopy and Microanalysis Courses at UWA, including:
 - a) Electron Microprobe Analysis
 - b) Transmission Electron Microscopy
 - c) Materials Transmission Electron Microscopy
 - d) Scanning Electron Microscopy
 - e) Confocal/Optical Microscopy
- (2) Completed certificate for Laboratory Safety course in the UWA
- (3) Completed the course Signals and Systems in the UWA (High Distinction)

3. **Research Institute of Synthetic Crystals (RISC), Beijing, China**

02/2001–01/2003: Research Scientist, Optical Crystal Group

- Establishment and management of two research groups (one for Czochralski, the other for Bridgman) and one optical laboratory
- Responsible for ISO9001 certification
- Study and growth of high optical quality, large-size, IR and UV single crystals for defence and civilian applications.

10/1996–02/2000: Senior Materials Engineer

- In charge of key materials research project for defense purposes sponsored by China National Science and Technology Committee
- Focused on chemical vapor deposition (CVD) method
- Growth of II–VI compound semiconductor ZnS for use as infrared optical windows and domes in infrared imaging and multi-spectrum accuracy guidance systems

08/1989–10/1996: Engineer

- Conducted extensive research on single crystal growth techniques
- Hydrothermal technique—SiO₂
- Scintillation crystal—Tl: CsI
- IR & UV optical crystals—Sapphire, MgF₂, CaF₂ & LiF
- Laser crystals—Cr:LiSAF₆, Nd:YVO₄

- Nonlinear optical crystals—KTP & LBO

Main Funding Record

- National Defense War Industry Supplies Project “Study on Growth Technology of Infrared Crystal CaF₂” (2002)
- National Defense War Industry Supplies Projects “Study on Growth Technology of Infrared Window Material GaP” and “Study on Growth Technology of Infrared Window Material ZnS” (2000)
- State Key Scientific and Technological Program (863) Project “Research on a Novel Laser Crystal Material Cr:LiSAF₆” (1997)

Note: All the projects above have been finished in the Research Institute of Synthetic Crystals, Beijing, China.

- “High throughput discovery of scintillator materials,” funded by DHS/DNDO (2008-2016)
- “Crystal growth of detector materials,” funded by DOE/NNSA/NA22 (2008-2016)
- “Crystal Growth for the Quantum Materials Program “funded by DOE/BES (2008-2016)

Invitation Presentations :

1. “Materials Discovery and Engineering for Light Capture: Synthesis, Crystal Growth and Characterization” invited by the JCAP North All Hands meeting, Asilomar conference center, Pacific Grove, California on Wednesday, February 19th, 2014.
2. “Eu²⁺-activated BaCl₂, BaBr₂ and BaI₂ scintillators revisited” invited by the SORMA West, Oakland, CA, May, 2012.
3. “New Scintillator compound synthesis and growth in LBNL” invited by The 16th International Conference on Crystal Growth(*ICCG-16*), Beijing, China on August 2010.
4. “Introduction of one of the largest crystal growth research laboratories in the US” invited by the School of Physics, University of Western Australia, Perth, Australia on April 2010.
5. “Large-size sapphire defect detection by Automatic Rayleigh Scattering Mapping System” invited by the Research Institute of Synthesis Crystals, Beijing, China on June 2006.

Patents

1. United States Patent, Patent No.: US 9,053,832 B2, Jun. 9, 2015
2. Patent Application Publication, Pub. No.: US 2012/0193539 A1, Aug. 2, 2012
3. 中国专利 CN102956739A, 2013/03/06
4. 中国专利 CN104199079B, 2016/11/09

Publications

1. Aleksander B. Mosberg, et al., "**FIB lift-out of conducting ferroelectric domain walls in hexagonal manganites**," Appl. Phys. Lett. 115, 122901 (2019)
2. S. Hayashida, L. Stoppel, Z. Yan, S. Gvasaliya, A. Podlesnyak, and A. Zheludev, "**Chemical composition induced quantum phase transition in $\text{Cs}_{1-x}\text{Rb}_x\text{FeCl}_3$** ", Phys. Rev. B 99, 224420 (2019).
3. K. Y. Povarov, V. K. Bhartiya, Z. Yan, A. Zheludev, "**Thermodynamics of a frustrated quantum magnet on a square lattice**", Phys. Rev. B 99, 024413 (2019).
4. P. Schoenherr, K. Shapovalov, J. Schaab, Z. Yan, E. Bourret, M. Hentschel, M. Stengel, M. Fiebig, A. Cano, and D. Meier, "**Observation of uncompensated bound charges at improper ferroelectric domain walls**", Nano Letters, DOI: 10.1021/acs.nanolett.8b04608, (2019)
5. J. Schaab, S. H. Skjærvø, S. Krohns, X. Dai, M. Holtz, A. Cano, M. Lilienblum, Z. Yan, E. Bourret, D. A. Muller, M. Fiebig, S. M. Selbach, and D. Meier, "**Electrical half-wave rectification at ferroelectric domain walls**", Nature Nano. 13, 1028 (2018)
6. A. Ruff, Z. Li, A. Loidl, J. Schaab, M. Fiebig, A. Cano, Z. Yan, E. Bourret, J. Glaum, D. Meier, and S. Krohns, "**Frequency dependent polarization switching in $h\text{-ErMnO}_3$** ", Appl. Phys. Lett. 112, 182908 (2018)
7. T. S. Holstad, D. M. Evans, A. Ruff, D. R. Småbråten, J. Schaab, Ch. Tzschaschel, Z. Yan, E. Bourret, S. M. Selbach, S. Krohns, and D. Meier, "**Electronic bulk and domain wall properties in B-site doped hexagonal ErMnO_3** " Phys. Rev. B 97, 085143 (2018)
8. J. A. Mundy, J. Schaab, Y. Kumagai, A. Cano, M. Stengel, I. P. Krug, D. M. Gottlob, H. Doganay, M. E. Holtz, R. Held, Z. Yan, E. Bourret, C. M. Schneider, D. G. Schlom, D. A. Muller, R. Ramesh, N. A. Spaldin and D. Meier, "**Functional electronic inversion layers at ferroelectric domain walls**" Nat. Mater. 16, 622-627 (2017)
9. M. E. Holtz, K. Shapovalov, J. A. Mundy, C. S. Chang, Z. Yan, E. Bourret, D. A. Muller, D. Meier, and A. Cano, "**Topological defects in hexagonal manganites - Inner structure and emergent electrostatics**" Nano Letters. 17, 5883 (2017)
10. N. Faraji, Z. Yan, and J. Seidel, "**Electrical conduction at domain walls in lead titanate (PbTiO_3) single crystals**" Appl. Phys. Lett. 110, 213108 (2017)
11. Q. N. Meier, M. Lilienblum, S. M. Griffin, K. Conder, E. Pomjakushina, Z. Yan, E. Bourret, D. Meier, F. Lichtenberg, E. K. H. Salje, N. A. Spaldin, M. Fiebig, and A. Cano, "**Global formation of topological defects in the multiferroic hexagonal manganites**" Phys. Rev. X7, 041014 (2017).
12. E. Hassanpour, V. Wegmayr, J. Schaab, Z. Yan, E. Bourret, Th. Lottermoser, M. Fiebig and D. Meier, "**Robustness of magnetic and electric domains against charge carrier doping in multiferroic hexagonal ErMnO_3** " New J. Phys. 18, 043015 (2016)
13. Z. Yan, et al., "**Czochralski Growth of the Mixed Halides BaBrCl and BaBrCl:Eu** " J. Cryst. Growth, 435C, p42-45 (2016)

14. J. Schaab, A. Cano, M. Lilienblum, Z. Yan, E. Bourret, R. Ramesh, M. Fiebig, and D. Meier, "**Optimization of electronic domain-wall properties by aliovalent cation substitution**" *Adv. Electron. Mater.* 2, 1500195 (2016)
15. J. Schaab, M. Trassin, A. Scholl, A. Doran, Z. Yan, E. Bourret, R. Ramesh, and D. Meier, "**Ferroelectric domains in the multiferroic phase of ErMnO₃ imaged by low-temperature photoemission electron microscopy**" *J. Phys.: Conf. Ser.* 592, 012120 (2015)
16. Z. Yan, et al., "**Growth of high-quality hexagonal ErMnO₃ single-crystals by the pressurized floating-zone method**" *J. Cryst. Growth*, 409, 75 (2015)
17. J. Schaab, ... Z. Yan, et al., "**Imaging and characterization of conducting ferroelectric domain walls by photoemission electron microscopy**" *Appl. Phys. Lett.* 104, 232904 (2014)
18. Z. Yan, et al., "**Eu²⁺-activated BaCl₂, BaBr₂ and BaI₂ scintillators revisited**" *Nuclear Instruments & Methods in Physics Research Section A—Accelerators, Spectrometers, Detectors and Associated Equipment*, 735, 83 (2014)
19. G. Gundiah, K. Brennan, Z. Yan, et al., "**Structure and scintillation properties of Ce³⁺-activated Cs₃LaCl₆, Cs₂NaLaCl₆, Cs₃LaBr₆, Cs₂NaLaBr₆, Cs₃LaI₆ and Cs₂NaLaI₆**" *Journal of Luminescence*, 149, 374 (2014)
20. Edward S. Barnard, Eric T. Hoke, Stephen T. Connor, James R. Groves, Tevye Kuykendall, Zewu Yan, Eric C. Samulon, Edith D. Bourret-Courchesne, Shaul Aloni, P. James Schuck, Craig H. Peters & Brian E. Hardin, "**Probing carrier lifetimes in photovoltaic materials using subsurface two-photon microscopy**" *Sci. Rep.* 3, 2098–2106 (2013), DOI: 10.1038/srep02098
21. Z. Yan, G. Bizarri, et. al., "**Scintillation Properties of Improved 5% Eu²⁺-dope BaCl₂ Single Crystal for X-ray and γ -ray Detection**" *Nuclear Instruments & Methods in Physics Research Section A—Accelerators, Spectrometers, Detectors and Associated Equipment*, 698, 7 (2013)
22. Stephen E. Derenzo, *Fellow, IEEE*, Edith Bourret-Courchesne, Zewu Yan, Gregory Bizarri, Haisheng Fang, Andrew Canning, and Gaigong Zhang "**Experimental and Theoretical Studies of Donor-Acceptor Scintillation from PbI₂**" *Journal of Luminescence*, 134, 28 (2013)
23. E.D. Bourret-Courchesne, ..., Z. Yan, et. al., "**Crystal growth and characterization of alkali-earth halide scintillators**" *J. Cryst. Growth.*, 352, 78 (2012)
24. G. Bizarri, E.D. Bourret-Courchesne, Z. Yan, and S.E. Derenzo, "**Scintillation and Optical Properties of BaBrI:Eu²⁺ and Ba₂CsI₅:Eu²⁺**" *IEEE Trans. Nucl. Sci.*, 58 (6), 3403 (2011)
25. H. Fan, Z. Yan, et al., "**Numerical Study of the Micro-pulling-down Process for Sapphire Fiber Crystal Growth**" *Cryst. Growth Des.*, 11 (1), 121 (2011)
26. E.D. Bourret-Courchesne, G. Bizarri, et al., "**BaBrI:Eu²⁺, a new bright scintillator**" *Nuclear Instruments & Methods in Physics Research Section A—Accelerators, Spectrometers, Detectors and Associated Equipment*, 613(1), 95 (2010)
27. E.D. Bourret-Courchesne, G. Bizarri, et al., "**Eu²⁺-doped Ba₂CsI₅, a new high-performance scintillator**" *Nuclear Instruments & Methods in Physics Research Section A—Accelerators, Spectrometers, Detectors and Associated Equipment*, 612(1), 138 (2009)

28. L. Ju, X. Ch, et al., **“Scattering in sapphire test mass for gravitational wave detector”** *Journal of Optics A: Pure Applied. Optics*, 11, 125205 (2009)
29. A. F. Brooks, D. Hosken, et al., **“Direct measurement of absorption-induced wavefront distortion in high optical power systems”** *Journal of Applied Physics*, 48(2), 335 (2009)
30. **Z. Yan**, 17th American Conference on Crystal Growth and Epitaxy, 2009 in Wisconsin, USA. Poster **“Growth of Large-size Multiferroric Single Crystal BiFeO₃”**.
31. D. G. Blair, P. Barriga, et al., **“The Science benefits and Preliminary Design of the Southern hemisphere Gravitational Wave Detector AIGO”** *Journal of Physics: Conference Series*, 122, 012001 (2008)
32. **Z. Yan**, L. Ju, et al., **“Rayleigh scattering, absorption, and birefringence of large-size bulk single-crystal sapphire”** *Journal of Applied Optics*, 45(12), 2631 (2006)
33. **Z. Yan**, C. Zhao, et al., **“Automatic Rayleigh Scattering Mapping System (ARSMS) for Optical Quality Evaluation of Test Masses for Gravity Wave Detectors”** *Review of Scientific Instruments*, 76, 015104 (2005)
34. **Z. Yan**, L. Ju, et al., **“High Mechanical Quality Factor of Calcium Fluoride (CaF₂) at Room Temperature”** *Journal of Applied Physics*, 30(3), 189 (2005)
35. **Z. Yan**, Australian Institute of Physics Congress, January 31–February 4, 2005 in Canberra. Poster **“Study on Correlation between Rayleigh Scattering & Absorption in Large Size Bulk Single Crystal Sapphire”**.
36. **Z. Yan**, 6th Edoardo Amaldi Conference on Gravitational Waves, June 19–24, 2005 in Okinawa, Japan. Poster **“Study of Rayleigh Scattering, Absorption and Birefringence of Large Size Bulk Single Crystal Sapphire”**.
37. **Z. Yan**, L. Ju, et al., **“Study of Growth defects in Sapphire by Laser Rayleigh Scattering Imaging”** *Journal of Optics A: Pure and Applied Optics*, 6(6), 635 (2004)
38. **Z. Yan**, L. Ju, et al., **“Large-Scale Inhomogeneity in Sapphire Test Masses Revealed by Rayleigh Scattering Imaging”** *Classical and Quantum Gravity*, 21(5), S1139 (2003)
39. **Z. Yan**, 5th Edoardo Amaldi Conference on Gravitational Waves, 2003 in Tirrenia (Pisa), Italy. Poster **“Large-Scale Inhomogeneity in Sapphire Test Masses Revealed by Rayleigh Scattering Imaging”**.
40. **Z. Yan**, H. Wang, et al., **“Study on Growth Technology and Crystal Defects in CVD-ZnS”** *Journal of Synthetic Crystals*, 31 (2), 315 (2002)
41. **Z. Yan**, H. Wang, et al., **“Preparation and Characterization of Infrared Crystal ZnS Bulk Materials by Chemical Vapor Deposition Method (CVD)”** *Journal of Synthetic Crystals*, 31 (1), 293 (2002)
42. Z. Fang, Y. Cai, et al.: **“CVD growth of bulk polycrystalline ZnS and its optical properties”** *Journal of Crystal Growths*, 237-239(3), 1707 (2002)
43. Y. Dong, Y. Cai, et al., **“Study on Polycrystal Growth of ZnSe by CVD Method”** *proceedings of the Second Young Scientist Conference of the Chinese Ceramic Society, Beijing, March*, 331 (2001)
44. **Z. Yan**, H. Wang, et al., **“Growth Structure Defects and Properties of the IR Optical**

Materials—Gallium phosphide (GaP)” proceedings of the 12th Chinese Conference on Crystals Growth and Materials, Shanghai, May, 156 (2000)

45. Y. Yang, H. Wang, et al., “**Study on Gallium Phosphide (GaP) Crystal Growth**” *proceedings of the 12th Chinese Conference on Crystals Growth and Materials, Shanghai, May, 172 (2000)*
46. H. Wang, Y. Cai, et al., “**Plane and Curve Surface Bulk Polycrystal ZnS Growth by CVD**” *Journal of Synthetic Crystal, 29, 232 (2000)*
47. C. Huang, R. Shi, et al., “**Growth and Application of Tunable Laser Crystal Cr:LiSrAlF₆**” *Journal of Synthetic Crystals, 29, 197 (2000)*