

## SUNG-KWAN MO

Lawrence Berkeley National Lab  
1 Cyclotron Rd., MS 7R0100  
Berkeley, CA 94720  
Phone: +1-510-495-2903  
FAX: +1-510-486-4229  
[SKMo@lbl.gov](mailto:SKMo@lbl.gov)

### EDUCATION

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**Ph. D. Physics** University of Michigan, Ann Arbor, MI, August 2006  
Advisor: Prof. James W. Allen  
Dissertation Title: "Electron spectroscopy studies of strongly correlated vanadium compounds"

**B. Sc. Physics** Seoul National University, Seoul, Korea, August 1999

### RESEARCH EXPERIENCE

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- Sep 2006 – present **Postdoctoral Research Fellow:** Stanford University, Prof. Z.-X. Shen
- High-resolution angle-resolved photoemission spectroscopy on strongly correlated cobalt oxides and heavy fermion materials using synchrotron light at the Advanced Light Source and at the Stanford Synchrotron Radiation Center
  - Maintenance, upgrade and user support at the beamline 10.0.1 of the Advanced Light Source
- Jun 2006 – Aug 2006 **Visiting Research Investigator:** University of Michigan, Prof. James W. Allen
- May 2000 – Apr 2006 **Graduate Research Assistant:** University of Michigan, Prof. James W. Allen
- Photoemission, angle-resolved photoemission, resonant photoemission, and X-ray absorption spectroscopies on strongly correlated transition metal compounds at the Synchrotron Radiation Center at the University of Wisconsin, the Advanced Light Source at the Lawrence Berkeley National Lab, and SPring-8 at Hyogo, Japan.
  - Participated in upgrading the ESCALAB MARK II home laboratory system to enable angle resolved photoemission. Designed and machined parts of the upgraded system, developed parts of the data acquisition software using LabView, and performed calibration and troubleshooting of the system after the installation.

### TEACHING EXPERIENCE

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- Sep 1999 – Apr 2000 Graduate Student Instructor: Department of Physics, University of Michigan
- Taught introductory physics laboratory, planned exams and assignments and held office hours

### PUBLICATIONS

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S.-K. Mo, H.-D. Kim, J.D. Denlinger, J.W. Allen, J.-H. Park, A. Sekiyama, A. Yamasaki, S. Suga, Y. Saitoh, T. Muro, and P. Metcalf, "Photoemission study of  $(V_{1-x}M_x)_2O_3$  (M=Cr, Ti)", Physical Review B **74**, 165101 (2006).

Feng Wang, S.-K. Mo, J. W. Allen, H.-D. Kim, J. He, R. Jin, D. Mandrus, A. Sekiyama, M. Tsunekawa and S. Suga, “Case for the bulk nature of the spectroscopic Luttinger liquid signatures observed in angle-resolved photoemission spectra of  $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ”, *Physical Review B* **74**, 113107 (2006).

Feng Wang, J. V. Alvarez, S.-K. Mo, J. W. Allen, G.-H. Gweon, J. He, R. Jin, D. Mandrus, H. Höchst, “New Luttinger liquid physics from photoemission on  $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ”, *Physical Review Letters* **96**, 196403 (2006).

G. Sangiovanni, A. Toschi, E. Koch, K. Held, M. Capone, C. Castellani, O. Gunnarsson, S.-K. Mo, J. W. Allen, H.-D. Kim, A. Sekiyama, A. Yamasaki, S. Suga, and P. Metcalf, “Static versus dynamical mean field theory of Mott antiferromagnets”, *Physical Review B*, **73**, 205121 (2006).

G.-H. Gweon, S.-K. Mo, J.W. Allen, C.R. Ast, H. Höchst, J. L. Sarrao, and Z. Fisk, “Hidden one-dimensional electronic structure and non-Fermi-liquid angle-resolved photoemission line shapes of  $\eta\text{-Mo}_4\text{O}_{11}$ ”, *Physical Review B* **72**, 035126 (2005).

K. Held, J.W. Allen, V.I. Anisimov, V. Eyert, G. Keller, H.-D. Kim, S.-K. Mo, and D. Vollhardt, “Two Aspects of the Mott-Hubbard Transition in Cr-doped  $\text{V}_2\text{O}_3$ ”, *Physica B* **359-361**, 642 (2005).

V.I. Anisimov, D.E. Kondakov, A.V. Kozhevnikov, I.A. Nekrasov, Z.V. Pchelkina, J.W. Allen, S.-K. Mo, H.-D. Kim, P. Metcalf, S. Suga, A. Sekiyama, G. Keller, I. Leonov, X. Ren, and D. Vollhardt, “Full orbital calculation scheme for materials with strongly correlated electrons”, *Physical Review B* **71**, 125119 (2005).

G.-H. Gweon, S.-K. Mo, J.W. Allen, J. He, R. Jin, D. Mandrus, and H. Höchst, “Luttinger liquid angle-resolved photoemission line shapes from samples of  $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$  grown by the temperature-gradient-flux technique”, *Physical Review B* **70**, 153103 (2004).

S.-K. Mo, J.D. Denlinger, H.D. Kim, J.W. Allen, A. Sekiyama, A. Yamasaki, S. Suga, Y. Saitoh, T. Muro, and P. Metcalf, “Distortion of V 3d line shape due to Auger emission in resonant photoemission spectra of  $(\text{V}_{1-x}\text{Cr}_x)_2\text{O}_3$  at the V 2p  $\rightarrow$  3d absorption edge”, *Physica B* **351**, 235 (2004).

S.-K. Mo, H.D. Kim, J.W. Allen, G.H. Gweon, J.D. Denlinger, J.H. Park, A. Sekiyama, A. Yamasaki, S. Suga, P. Metcalf, and K. Held, “Filling of the Mott-Hubbard gap in the high temperature photoemission spectrum of  $(\text{V}_{0.972}\text{Cr}_{0.028})_2\text{O}_3$ ”, *Physical Review Letters* **93**, 076404 (2004).

S.-K. Mo, J.D. Denlinger, H.-D. Kim, J.-H. Park, J.W. Allen, A. Sekiyama, A. Yamasaki, K. Kadono, S. Suga, Y. Saitoh, T. Muro, P. Metcalf, G. Keller, K. Held, V. Eyert, V.I. Anisimov, and D. Vollhardt, “Prominent quasiparticle peak in the photoemission spectrum of the metallic phase of  $\text{V}_2\text{O}_3$ ”, *Physical Review Letters* **90**, 186403 (2003).

J.D. Denlinger, G.-H. Gweon, S.-K. Mo, J.W. Allen, J.L. Sarrao, A.D. Bianchi, and Z. Fisk, “Absence of X-point band overlap in divalent hexaborides and variability of the surface chemical potential”, *Journal of Physical Society of Japan* **71**, suppl. 1 (2002).

S.-K. Mo, G.-H. Gweon, J.D. Denlinger, H.-D. Kim, J.W. Allen, C.G. Olson, H. Höchst, J.L. Sarrao, and Z. Fisk, “ARPES study of X-point band overlaps in  $\text{LaB}_6$  and  $\text{SmB}_6$  - contrast to  $\text{SrB}_6$  and  $\text{EuB}_6$ ”, *Physica B* **312**, 668 (2002).

## PAPERS SUBMITTED / IN PREPARATION

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S.-K. Mo, F. Wang, J. W. Allen, J. He, R. Jin, D. Mandrus and H. Höchst, “Quasi-one-dimensional electronic structure of  $\beta'$ - $\text{Cu}_x\text{V}_2\text{O}_3$  ( $x=0.33 \sim 0.65$ ) studied by photoemission spectroscopy”, in preparation, to be submitted to Physical Review B.

S.-K. Mo, F. Wang, J.W. Allen, H.-D. Kim, E.-J. Cho, W. Tian, R. Jin, D. Mandrus, H. Höchst, M. Tsunekawa, A. Sekiyama, and S. Suga, “Metal-insulator transition and electronic structure of quasi-one-dimensional  $\text{BaVS}_3$  studied by photoemission”, in preparation, to be submitted to Physical Review B.

S.-K. Mo, J. W. Allen, H.-D. Kim, A. Sekiyama, A. Yamasaki, M. Tsunekawa, S. Suga, Y. Matsushita, H. Ueda, and H. Takagi, “Electronic structure of 3d heavy-fermion metal  $\text{LiV}_2\text{O}_4$  studied by photoemission”, in preparation.

## PRESENTATIONS

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S.-K. Mo, “High energy photoemission in soft x-ray regime - two case studies with  $(\text{V}_{1-x}\text{Cr}_x)_2\text{O}_3$  and  $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ”, ALS/CXRO Seminar, October 18, Berkeley, California (2006).

S.-K. Mo, F. Wang, J. W. Allen, J. He, R. Jin, D. Mandrus and H. Höchst, “Quasi-one-dimensional electronic structure of  $\beta'$ - $\text{Cu}_x\text{V}_2\text{O}_3$  ( $x=0.33 \sim 0.65$ ) studied by photoemission spectroscopy”, American Physical Society March Meeting, March 13-17, Baltimore, Maryland (2006).

S.-K. Mo, “Angle resolved photoemission study of quasi-one-dimensional  $\beta'$ - $\text{Cu}_x\text{V}_2\text{O}_3$  ( $x=0.33 \sim 0.65$ )”, Synchrotron Radiation Center Annual Users Meeting, October 14-15, Stoughton, Wisconsin (2005).

S.-K. Mo, J.W. Allen, H.-D. Kim, E.-J. Cho, W. Tian, R. Jin, D. Mandrus, H. Höchst, M. Tsunekawa, A. Sekiyama, and S. Suga, “Metal-insulator transition and electronic structure of quasi-one-dimensional  $\text{BaVS}_3$  studied by photoemission”, American Physical Society March Meeting, March 21-25, Los Angeles, California (2005).

S.-K. Mo, J. D. Denlinger, H.-D. Kim, J.-H. Park, J.W. Allen, A. Sekiyama, A. Yamasaki, K. Kadono, S. Suga, Y. Saitoh, T. Muro, P. Metcalf, G. Keller, K. Held, V. Eyert, V.I. Anisimov, and D. Vollhardt, “Prominent quasi-particle peak and high temperature correlation gap filling in photoemission spectra of the PM and PI phases of  $(\text{V}_{1-x}\text{Cr}_x)_2\text{O}_3$ ”, Gordon Research Conference: Correlated Electron Systems, June 20-25, Mount Holyoke College, South Hadley, Massachusetts (2004) [poster].

S.-K. Mo, J.W. Allen, G.-H. Gweon, J. He, R. Jin, D. Mandrus, and H. Höchst, “Quantum critical scaling in the angle-resolved photoemission spectrum of  $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ”, American Physical Society March Meeting, March 22-26, Montreal, Canada (2004).

S.-K. Mo, J.D. Denlinger, H.-D. Kim, J.-H. Park, J.W. Allen, A. Sekiyama, A. Yamasaki, K. Kadono, S. Suga, Y. Saitoh, T. Muro, P. Metcalf, G. Keller, K. Held, V. Eyert, V.I. Anisimov, and D. Vollhardt, “Prominent quasiparticle peak in the photoemission spectrum of the metallic phase of  $\text{V}_2\text{O}_3$ ”, American Physical Society March Meeting, March 3-7, Austin, Texas (2003).

S.-K. Mo, H.-D. Kim, J.W. Allen, A. Sekiyama, A. Yamasaki, S. Suga, and P. Metcalf, “High-resolution bulk-sensitive photoemission study of V<sub>2</sub>O<sub>3</sub>: Surface vs bulk”, American Physical Society March Meeting, March 18-22, Indianapolis, Indiana (2002).

S.-K. Mo, H.-D. Kim, J.W. Allen, A. Sekiyama, A. Yamasaki, S. Suga, and P. Metcalf, “Hubbard gap filling at high temperature in the vanadium 3d photoemission spectrum of (V<sub>0.972</sub>Cr<sub>0.028</sub>)<sub>2</sub>O<sub>3</sub>”, American Physical Society March Meeting, March 18-22, Indianapolis, Indiana (2002).

G.-H. Gweon, S.-K. Mo, J.W. Allen, H. Höchst, J.L. Sarrao, and Z. Fisk, “Hidden one-dimensional electronic structure of η-Mo<sub>4</sub>O<sub>11</sub>”, American Physical Society March Meeting, March 18-22, Indianapolis, Indiana (2002).

S.-K. Mo, G.-H. Gweon, J.D. Denlinger, H.-D. Kim, J.W. Allen, C.G. Olson, H. Höchst, J.L. Sarrao, and Z. Fisk, “ARPES study of X-point band overlaps in LaB<sub>6</sub> and SmB<sub>6</sub> - contrast to SrB<sub>6</sub> and EuB<sub>6</sub>”, The International Conference on Strongly Correlated Electron Systems (SCES2001), August 6-10, Ann Arbor, Michigan (2001) [poster].

## AWARDS AND HONORS

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1999-2000 Graduate Fellowship, Department of Physics, University of Michigan  
 1999 Graduated “with distinction” from Seoul National University

## SKILLS

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- Data analysis skills including programming, image analysis, spectroscopic lineshape analysis and curve-fitting
- Computer programming language: C, C++, LabView, perl, python
- Scientific computing packages: Igor Pro, MatLab, Mathematica
- Language: Korean (native), German (basic)

## REFERENCES

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**Prof. James W. Allen** [jwallen@umich.edu](mailto:jwallen@umich.edu)  
 Department of Physics, University of Michigan, 450 Church St., Ann Arbor, MI 48109, USA

**Prof. Zhi-Xun Shen** [zxshen@stanford.edu](mailto:zxshen@stanford.edu)  
 Department of Applied Physics, Stanford University, 476 Lomita Mall, Stanford, CA 94305, USA

**Dr. Hartmut Höchst** [hhochst@facstaff.wisc.edu](mailto:hhochst@facstaff.wisc.edu)  
 Synchrotron Radiation Center, 3731 Schneider Dr., Stoughton, WI 53589, USA

**Prof. Shigemasa Suga** [suga@mp.es.osaka-u.ac.jp](mailto:suga@mp.es.osaka-u.ac.jp)  
 Department of Materials Physics, Graduate School of Engineering Science, Osaka University,  
 1-3 Machikaneyama, Toyonaka, Osaka 560-8531, Japan