

Curriculum Vitae

Norman Mannella

Norman Mannella
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PROFESSIONAL HISTORY

- Aug. 2007 – Present **Assistant Professor**, Department of Physics and Astronomy,
University of Tennessee – Knoxville, USA
- Oct. 2006 – Aug. 2007 **Research Associate**, GLAM, Physics Department, Stanford University – USA
Prof. Z. X. Shen's group
- Oct. 2006 – Aug. 2007 **Beamline Scientist (Bl. 10.0.1)**, Advanced Light Source, LBNL, Berkeley USA.
Scientific Support Group, Dr. Z. Hussain
- Oct. 2003 – Oct. 2006 **Visiting Scientist**, Advanced Light Source, LBNL, Berkeley – USA
Scientific Support Group, Dr. Z. Hussain

EDUCATION and POSTDOCTORAL

Postdoctoral Fellow, GLAM, Physics Department, Stanford University – USA (Oct. 2003 – Oct.2006)
Advisor: Prof. Z. X. Shen

PhD in Physics, UC Davis, Department of Physics (June 2003)

Thesis title: *Soft X-ray Spectroscopic and Structural Studies of Strongly Correlated Oxides*
Thesis advisor: Prof. Charles S. Fadley

Laurea in Fisica (Master in Physics), Universita' degli Studi di Milano, Milano, Italy (1996)

Overall grade 110/110--*cum laude (summa cum laude)*

Thesis title: *Study of Multi-Electron Excitations in Photoemission Spectra from Porous Silicon*
Thesis advisor: Prof. Fulvio Parmigiani

RESEARCH INTERESTS

Physics of novel materials and complex electron systems. Strongly correlated transition metal oxides (colossal magnetoresistive manganites, high temperature superconductors, cobalt oxides).

Physics of magnetic, ferroelectric and dielectric materials suitable for technological applications. Novel materials characterization methodology.

Atomic, electronic, magnetic and orbital dynamics in complex electron systems. Sub-picoseconds temporal dynamics of different degrees of freedom in complex electron systems. Phase transitions.

Properties, growth and characterization of low dimensional materials, nanostructures, surfaces and interfaces in materials of technological relevance.

Light - matter interaction and physics of the fundamental processes concerning the use and development of soft-x-ray spectroscopies techniques. High-resolution angle-resolved photoemission spectroscopy (ARPES), core level photoemission spectroscopy, x-ray absorption spectroscopy (XAS), soft x-ray emission spectroscopy (XES) and inelastic x-ray scattering (RIXS). Development of advanced scientific instrumentation for x-ray spectroscopies.

PUBLICATIONS

[Universal versus Material-Dependent Two-Gap Behaviors of the High- \$T_c\$ Cuprate Superconductors: Angle-Resolved Photoemission Study of \$\text{La}_{2-x}\text{Sr}_x\text{CuO}_4\$](#)

T. Yoshida, M. Hashimoto, S. Ideta, A. Fujimori, K. Tanaka, **N. Mannella**, Z. Hussain, Z.-X. Shen, M. Kubota, K. Ono, Seiki Komiya, Yoichi Ando, H. Eisaki, and S. Uchida
Physical Review Letters **103**, 037004 (2009)

[Evidence for three-dimensional Fermi-surface topology of the layered electron-doped iron superconductor \$\text{Ba}\(\text{Fe}_{1-x}\text{Co}_x\)_2\text{As}_2\$](#)

P. Vilmercati, A. Fedorov, I. Vobornik, U. Manju, G. Panaccione, A. Goldoni, A. S. Sefat, M. A. McGuire, B. C. Sales, R. Jin, D. Mandrus, D. J. Singh, and **N. Mannella**
Physical Review B **79**, 220503(R) (2009)

[Energy gaps in the failed high- \$T_c\$ superconductor \$\text{La}_{1.875}\text{Ba}_{0.125}\text{CuO}_4\$](#)

Rui-Hua He, Kiyohisa Tanaka, Sung-Kwan Mo, Takao Sasagawa, Masaki Fujita, Tadashi Adachi, **Norman Mannella**, Kazuyoshi Yamada, Yoji Koike, Zahid Hussain and Zhi-Xun Shen
Nature Physics **5**, 119 (2009)

[Evidence for Strong Itinerant Spin Fluctuations in the Normal State of \$\text{CeFeAsO}_{0.89}\text{F}_{0.11}\$ Iron-Oxypnictide Superconductors](#)

F. Bondino, E. Magnano, M. Malvestuto, F. Parmigiani, M. A. McGuire, A. S. Sefat, B. C. Sales, R. Jin, D. Mandrus, E. W. Plummer, D. J. Singh, and **N. Mannella**
Physical Review Letters **101**, 267001 (2008)

[Temperature-dependent electronic structure of the colossal magnetoresistive manganite \$\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3\$ from hard x-ray photoemission](#)

F. Offi, **N. Mannella**, T. Pardini, G. Panaccione, A. Fondacaro, P. Torelli, M. W. West, J. F. Mitchell, and C. S. Fadley
Physical Review B **77**, 174422 (2008)

[Determination of buried interface composition and magnetism profiles using standing-wave excited soft x-ray emission and inelastic scattering](#)

B. C. Sell, S. B. Ritchey, S.-H. Yang, S. S. P. Parkin, M. Watanabe, B. S. Mun, L. Plucinski, **N. Mannella**, A. Nambu, J. Guo, M. W. West, F. Salmassi, J. B. Kortright, and C. S. Fadley
Journal of Applied Physics **103**, 083515 (2008)

[Temperature dependent evolution of the electronic and local crystal structure of Colossal Magnetoresistive Manganites \$\text{La}_{1-x}\text{Sr}_x\text{MnO}_3\$](#)

N. Mannella, C. H. Booth, A. Rosenhahn, B. C. Sell, A. Nambu, S. Marchesini, B. S. Mun, S.-H. Yang, M. Watanabe, K. Ibrahim, E. Arenholz, A. Young, J. Guo, Y. Tomioka, and C. S. Fadley
Phys. Rev. B **77**, 125134 (2008)

Polaron coherence condensation as the mechanism for colossal magnetoresistance in layered manganites

N. Mannella, W. Yang, K. Tanaka, X. J. Zhou, H. Zheng, J. F. Mitchell, J. Zaanen, T. P. Devereaux, N. Nagaosa, Z. Hussain and Z.-X. Shen
Phys. Rev. B **76**, 233102 (2007)

Hybridization of 4f states in heavy-fermion compounds YbRh₂Si₂ and YbIr₂Si₂

S.L. Molodtsov, S. Danzenbächer, Yu. Kucherenko, C. Laubschat, D.V. Vyalikh, Z. Hossain, C. Geibel, X.J. Zhou, W.L. Yang, **N. Mannella**, Z. Hussain, Z.-X. Shen, M. Shi and L. Patthey
Journal of Magnetism and Magnetic Materials **310**, 443 (2007)

Monochromatic electron photoemission from diamondoid monolayers

W.L. Yang, J.D. Fabbri, T.M. Willey, J.R.I. Lee, J.E. Dahl, R.M.K. Carlson, P. R. Schreiner, A. A. Fokin, B.A. Tkachenko, N.A. Fokina, W. Meevasana, **N. Mannella**, K. Tanaka, X.J. Zhou, T. van Buuren, M.A. Kelly, Z. Hussain, N.A. Melosh and Z.X. Shen
Science **316**, 1460 (2007)

Hierarchy of three many-body interaction scales in high-temperature superconductors

W. Meevasana, X.J. Zhou, S. Sahrakorpi, W.S. Lee, W.L. Yang, **N. Mannella**, T. Yoshida, Y.L. Chen, K. Tanaka, R.H. He, Hsin Lin, S. Komiya, Y. Ando, F. Zhou, W.X. Ti, J.W. Xiong, Z. X. Zhao, T. Sasagawa, T. Kakeshita, K. Fujita, S. Uchida, H. Eisaki, A. Fujimori, Z. Hussain, R. S. Markiewicz, A. Bansil, N. Nagaosa, J. Zaanen, T.P. Devereaux, and Z.-X. Shen
Physical Review B **75**, 174506 (2007)

Probing buried interfaces and layers with standing-wave excited photoelectron and X-ray emission spectroscopy

Sell BC, Yang SH, Mun BS, et al.
Journal of Electron Spectroscopy and Related Phenomena **156**, LXXX-LXXXI (2007)

Momentum dependence of 4f hybridization in heavy-fermion compounds: Angle-resolved photoemission study of YbIr₂Si₂ and YbRh₂Si₂

S. Danzenbächer, Yu. Kucherenko, D.V. Vyalikh, M. Holder, C. Laubschat, A N. Yaresko, C. Krellner, Z. Hossain, C. Geibel, X.J. Zhou, W.L. Yang, **N. Mannella**, Z. Hussain, Z.X. Shen., M. Shi, L Patthey, Molodtsov.
Physical Review B **75**, 045109 (2007)

Energy dispersion of 4f-derived emissions in photoelectron spectra of the heavy-fermion compound YbIr₂Si₂

S. Danzenbächer, Yu. Kucherenko, C. Laubschat, D. V. Vyalikh, Z. Hossain, C. Geibel, X. J. Zhou, W. L. Yang, **N. Mannella**, Z. Hussain, Z.-X. Shen and S. L. Molodtsov
Physical Review Letters **96**, 106402 (2006)

Relationship of tunnelling magnetoresistance and buried-layer densities of states as derived from standing-wave excited photoemission

S.-H. Yang, B. S Mun, **N. Mannella**, A. Nambu, B. C. Sell, S. B. Ritchey, F. Salmassi, A. Shick, S. S. P. Parkin and C. S. Fadley
Journal of Physics, Condensed Matter **18 (19)**: L259-L267 (2006)

Surface Characterization of Colossal Magnetoresistive Manganites La_{1-x}Sr_xMnO₃ using Photoelectron Spectroscopy

N. Mannella, A. Rosenhahn, A. Nambu, B. C. Sell, B. S. Mun, S.-H. Yang, S. Marchesini, M. Watanabe, K. Ibrahim, S. Ritchey, Y. Tomioka and C.S. Fadley
Journal of Electron Spectroscopy and Related Phenomena **153**, 37 (2006)

Observation and interpretation of x-ray optical and multi-atom resonant photoemission effects in O 1s emission from NiO

N. Mannella, S.-H. Yang, B. S. Mun, F. J. Garcia de Abajo, A. W. Kay, E. Arenholz, Z. Hussain, M. A. Van Hove, and C. S. Fadley
Physical Review B **74**, 165106 (2006)

Nodal Quasiparticle in Pseudogapped Colossal Magnetoresistive Manganites

N. Mannella, W. Yang, X. J. Zhou, H. Zheng, J. F. Mitchell, J. Zaanen, T. P. Devereaux, N. Nagaosa, Z. Hussain and Z.-X. Shen
Nature **438**, 474 (2005)

Temperature-Dependent X-Ray Absorption Spectroscopy of Colossal Magnetoresistive Perovskites

N. Mannella, A. Rosenhahn, M. Watanabe, B. Sell, A. Nambu, S. Ritchey, E. Arenholz, A. Young, Y. Tomioka and C.S. Fadley
Physical Review B **71**, 125117 (2005)

Multiple Bosonic Mode Coupling in Electron Self-Energy of $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$

X. J. Zhou, J. Shi, T. Yoshida, T. Cuk, W. L. Yang, V. Brouet, J. Nakamura, **N. Mannella**, Seiki Komiya, Yoichi Ando, F. Zhou, W. X. Ti, J. W. Xiong, Z. X. Zhao, T. Sasagawa, T. Kakeshita, H. Eisaki, S. Uchida, A. Fujimori, Zhenyu Zhang, E. W. Plummer, R. B. Laughlin, Z. Hussain, Z.-X. Shen
Physical Review Letters **95**, 117001 (2005)

O 2p hole-assisted electronic processes in the $\text{Pr}_{1-x}\text{Sr}_x\text{MnO}_3$ ($x = 0.0, 0.3$) system

K. Ibrahim, H. J. Qian, X. Wu, M. I. Abbas, J. O. Wang, C. H. Hong, R. Su, J. Zhong, Y. H. Dong, Z. Y. Wu, L. Wei, D. C. Xian, Y. X. Li, G. J. Lapeyre, **N. Mannella**, C. S. Fadley, and Y. Baba
Physical Review B **70**, 224433 (2004)

Correction of Non-Linearity Effects in Detectors for Electron Spectroscopy

N. Mannella, S. Marchesini, A.W. Kay, A. Nambu, T. Gresch, S.-H. Yang, B.S. Mun, J. M. Bussat, A. Rosenhahn and C.S. Fadley
Journal of Electron Spectroscopy and Related Phenomena **141**, 45 (2004)

O 1s2p2p Auger decay in the $\text{Pr}_{1-x}\text{Sr}_x\text{MnO}_3$ ($x=0.0, 0.3$) system with excitation energies from OK threshold through above Mn L edge

K. Ibrahim, H.J. Qian, M.I. Abbas, R. Su, J.O. Wang, Z.Y. Wu, **N. Mannella**, C.S. Fadley, G.J. Lapeyre GJ, and Y. Baba
Journal of Electron Spectroscopy and Related Phenomena **137**, 445 (2004)

An ultrahigh-speed one-dimensional detector for use in synchrotron radiation spectroscopy: first photoemission results

A. Nambu, J.-M. Bussat, M. West, B. C. Sell, c, M. Watanabe, A. W. Kay, **N. Mannella**, B. A. Ludewigt, M. Press, B. Turko, G. Meddeler, G. Zizka, H. Spieler, H. van der Lippe, P. Denes, T. Ohta, Z. Hussain and C. S. Fadley
Journal of Electron Spectroscopy and Related Phenomena **137**, 691 (2004)

Direct Observation of High-Temperature Polaronic Behavior in Colossal Magnetoresistive Manganites

N. Mannella, A. Rosenhahn, C. H. Booth, S. Marchesini, B.S. Mun, S.-H. Yang, K. Ibrahim, Y. Tomioka and C.S. Fadley,
Physical Review Letters **92**, 166401 (2004)

Overview of Core and Valence Photoemission

W. Schattke, M.A. Van Hove, F.J. García de Abajo, R. Díez Muiño and **N. Mannella**
Chapter 1 in "Solid-State Photoemission and Related Methods: Theory and Experiment",
Eds. W. Schattke and M.A. Van Hove, Wiley-VCH Verlag, Berlin (2003).

Probing Buried Magnetic Interfaces with Soft X-ray Standing Waves

B.S. Mun, S.-H. Yang, **N. Mannella**, A.W. Kay, S.-K. Kim, J.B. Kortright, J.H. Underwood, F. Salmassi, E. Arenholz, A. Young, Z. Hussain, M. A. Van Hove and C.S. Fadley
Journal of Physics, Condensed Matter **14**, L407-L420 (2002)

Holography of Diffraction Structure Factors

S. Marchesini, **N. Mannella**, C.S. Fadley, M.A. Van Hove, J.J. Bucher, D.K. Shuh, L. Fabris, M.J. Press, M.W. West, W.C. Stolte and Z. Hussain
Physical Review B **66**, 94111 (2002)

Plasmon Energy Shift in Porous Silicon measured by X-Ray Photoemission Spectroscopy

N. Mannella, G. Gabetta, F. Parmigiani
Applied Physics Letters **79**, 4432 (2001)

Multi-atom resonant photoemission

A. W. Kay, F. J. Garcia de Abajo, S. -H. Yang, E. Arenholz, B. S. Mun, N. Mannella, Z. Hussain, M. A. Van Hove, and C. S. Fadley
Journal of Electron Spectroscopy and Related Phenomena **114**, 1179 (2001)

Multi-atom resonant photoemission

A. W. Kay, F. J. Garcia de Abajo, S. -H. Yang, E. Arenholz, B. S. Mun, N. Mannella, Z. Hussain, M. A. Van Hove, and C. S. Fadley
Physical Review B **63**, 115119 (2001)

Surface chemical characterization and surface diffraction effects of real margarite (001): An angle-resolved XPS investigation

G.G. Biino, N. Mannella, A. Kay, B.S. Mun and C.S. Fadley
American Mineralogist, APR **84**, 629-638 (1999)

New diffraction techniques may improve understanding of mineral surfaces

G.G. Biino, B.S. Mun, N. Mannella, A. Kay, and C.S. Fadley
Eos, Transactions, American Geophysical Union **79**, 461-466 (1998)

INVITED TALKS AT SCIENTIFIC CONFERENCES AND WORKSHOPS

**Workshop - Scientific Opportunities with the JLAMP VUV/Soft X-ray Laser –
Jefferson Lab, Newport News, VA, July 24, 2009**
CMP at FEL: Quo Vadis?

**Southeast Ultrafast Conference, University of Central Florida - Orlando (FL) - The College of Optics and
Photonics and the new Townes Laser Institute, Jan 2009**
Soft x-ray spectroscopies studies of sub-picoseconds dynamics in complex electron systems

**FeAs High Tc Superconducting Multilayers and Related Phenomena - International Conferences on Stripes,
Dec. 2008, Rome, Italy**
Electronic structure of Iron Oxynictides Superconductors

**FeAs High Tc Superconducting Multilayers and Related Phenomena - International Conferences on Stripes,
Dec. 2008, Rome, Italy**
*Spectroscopic Evidence for Strong Itinerant Spin Fluctuations in the Normal State of CeFeAsO_{0.89}F_{0.11} Iron-
Oxynictides Superconductors*

**LEES 08, The International Conference on Low-Energy Electrodynamics in Solids 2008, Vancouver, Canada
June 2008**
Colossal Magnetoresistive Manganites and High Temperature Superconductors: so different, ... yet so similar

10th Joint MMM/Intermag Conference, Baltimore, Maryland, Jan 2007
Colossal Magnetoresistive Manganites and High Temperature Superconductors: so different, ... yet so similar

Workshop on “New directions in Photoelectron Spectroscopy”, 2006 ALS User Meeting, Berkeley, CA
Colossal Magnetoresistive Manganites and High Temperature Superconductors: so different, ... yet so similar

**Workshop on “Competing Interactions and Colossal Responses in Transition Metal Compounds”, Telluride
CO, July 2006**
Nodal Quasiparticle in Pseudogapped Colossal Magnetoresistive Manganites

**Gordon Research Conference on Correlated Electron Systems, Mount Holyoke College, South Hadley, MA,
June 2006**

Nodal Quasiparticle in Pseudogapped Colossal Magnetoresistive Manganites

Workshop on “Self-organized strongly correlated electron systems”, Seillac, France, May 28 – 2006
Quasiparticle Excitations in Colossal Magnetoresistive Manganites

Highlights Session in the 2005 ALS Users Meeting, Berkeley, CA
Nodal Quasiparticle in Pseudogapped Colossal Magnetoresistive Manganites

VUV 14, Cairns, Australia, July 2004
Electron localization, Polarons and Cluster States in Colossal Magnetoresistive Manganites

Highlights Session in the 2003 ALS Users Meeting, Berkeley, CA
Direct Observation of Electronic Structure Changes and Polarons on Crossing the Curie Temperature in $La_{1-x}Sr_xMnO_3$ Colossal Magnetoresistive Oxides

Ninth International Conference on Electronic Spectroscopy and Structure, Uppsala, Sweden, July 2003 2003
Polaronic Behavior in $La_{1-x}Sr_xMnO_3$ ($x = 0.3, 0.4$) Colossal magnetoresistive Manganites

Workshop on "Phase competition in transition metal oxides and other compounds", UC Berkeley (CA), May 2003
Direct Observation of Electronic Structure Changes and Polarons on Crossing the Curie Temperature in $La_{1-x}Sr_xMnO_3$ Colossal Magnetoresistive Oxides

INVITED RESEARCH SEMINARS AT UNIVERSITIES AND LABORATORIES

Naval Research Laboratories (NRL), Washington MD, Oct 2008,
Investigating Complex Electron Systems with Soft X-Ray Spectroscopies

Condensed Matter Physics Seminar, Physics Department - John Hopkins Baltimore MD, Oct 2008
Investigating Complex Electron Systems with Soft X-Ray Spectroscopies

Elettra Sincrotrone Trieste – Seminars Series, June 2008
Colossal Magnetoresistive Manganites and High Temperature Superconductors: so different, ... yet so similar

Condensed Matter Physics Theory Series, Oak Ridge National Laboratory, May 2008
High Temperature Superconductors and Colossal Magnetoresistive Manganites: so different, yet so similar

Condensed Matter Physics Seminar, Physics Department – Vanderbilt, April 2008
High Temperature Superconductors and Colossal Magnetoresistive Manganites: so different, yet so similar

Condensed Matter Physics Seminar, Department of Physics and Astronomy, UT Knoxville, Oct 2007
Soft X-Ray Spectroscopic Studies of Colossal Magnetoresistive Manganites

Condensed Matter Physics Seminar, Department of Physics and Astronomy, UT Knoxville, April 2007
Colossal magnetoresistive manganites and high temperature superconductors: so different, ... yet so similar

Condensed Matter Physics Seminar, Department of Physics and Astronomy, Michigan State University, March 2007
Colossal magnetoresistive manganites and high temperature superconductors: so different, ... yet so similar

Physics Colloquium, Department of Physics and Astronomy, Louisiana State University, March 2007
Colossal magnetoresistive manganites and high temperature superconductors: so different, ... yet so similar

Physics Colloquium, Physics Department, Case Western Reserve University, Feb 2007
Colossal magnetoresistive manganites and high temperature superconductors: so different, ... yet so similar

Condensed Matter Physics Seminar, Physics Department, UC Davis, March 2006
Nodal Quasiparticle in Pseudogapped Colossal Magnetoresistive Manganites

Physics Colloquium, Physics Department, UC Santa Cruz, Jan 2006
Nodal Quasiparticle in Pseudogapped Colossal Magnetoresistive Manganites

Materials Science Division, Argonne National Lab., Argonne (IL), Feb. 2006
Nodal Quasiparticle in Pseudogapped Colossal Magnetoresistive Manganites

CXRO/ALS Seminar, Advanced Light source, LBNL, Berkeley (CA) September 2005
Electron localization, Polarons and Cluster States in Colossal Magnetoresistive Manganites

Condensed Matter Physics Seminar, Physics Department, UBC, Vancouver, Canada, April 2005
Electron localization, Polarons and Cluster States in Colossal Magnetoresistive Manganites

Seminar at Elettra, Sincrotrone Trieste, Basovizza, Italy, March 2004
Electron localization, Polarons and Cluster States in Colossal Magnetoresistive Manganites

Seminar at Università' Cattolica del Sacro Cuore, Brescia, Italy, March 2004
Electron localization, Polarons and Cluster States in Colossal Magnetoresistive Manganites

MST 10 Seminar, LANL, Los Alamos (NM), May 2003
Direct Observation of Electronic Structure Changes and Polarons on Crossing the Curie Temperature in $La_{1-x}Sr_xMnO_3$ Colossal Magnetoresistive Oxides

Condensed Matter Physics Seminar, Physics Department, UC Davis, November 2002
Observation of a High-Temperature Electronic Phase Transition and Phase Separation in the Colossal Magnetoresistive Oxides $La_{1-x}Sr_xMnO_3$ ($x = 0.3, 0.4$)

HIGHLIGHTS IN THE PRESS

Polaron Coherence Condensation in Layered Colossal Resistive Manganites
[Highlighted in ALSNews vol. 289, July 30, \(2008\)](#)

Experiments debunk 'pseudogap' role in superconductivity, pave way to practical superconductors
[Highlighted in Physorg.com/news10505, Feb. 2 \(2006\)](#)

Experiments debunk 'pseudogap' role in superconductivity
[Highlighted in Stanford Report Feb. 1 \(2006\)](#)

Pseudogaps Are Not The Answer
[Highlighted in Science @ Berkeley Lab., Jan 30 \(2006\)](#)

Pseudogaps, polarons, and the mystery of high- T_c superconductivity
[Highlighted in ALSNews, vol. 264 \(2006\)](#)

Condensed-matter physics: Focus on the Fermi surface
[Highlighted in Nature 438, 435 \(2005\)](#)

A Different Spin on Future Data Storage
[Highlighted in Science @ Berkeley Lab., March 03 \(2005\)](#)

Polaron Behavior in CMR Manganites
[Highlighted in ALSNews, vol. 249 \(2005\)](#)