

# Curriculum Vitae<sup>1</sup> for Jaideep Taggart Singh

## Contact Information

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## Employment History

### 2014-08 to present Assistant Professor

National Superconducting Cyclotron Laboratory  
Michigan State University

### 2013-09 to 2014-08 Postdoctoral Research Scientist

Physik-Department E18, Technische Universität München  
Supervisor: Peter Fierlinger

### 2012-07 to 2013-08 Argonne Scholar - Postdoctoral Fellow

Physics Division, Argonne National Laboratory  
Supervisors: Zheng-Tian Lu & Donald F. Geesaman

### 2010-07 to 2012-07 Argonne Scholar - Director's Postdoctoral Fellow

Physics Division, Argonne National Laboratory  
Supervisors: Zheng-Tian Lu & Roy J. Holt

## Education

### 2010-12 Ph.D. in Physics, University of Virginia

*Alkali-Hybrid Spin-Exchange Optically-Pumped Polarized He-3 Targets  
Used for Studying Neutron Structure*  
Advisor: Gordon D. Cates, Jr.

### 2000-06 B.S. in Physics, California Institute of Technology

*Polarization & Delivery System for Xenon-129*  
Advisor: Emlyn W. Hughes

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<sup>1</sup>last updated October 11, 2014

## Research Narrative

My passion is creating, manipulating, and detecting spin-polarized nuclei. I utilize techniques borrowed from atomic, molecular and optical physics and applying them to problems of fundamental importance in nuclear physics. My research interests include tests of fundamental symmetries, low energy searches of physics beyond the Standard Model, studying rare nuclear reactions, and studying nucleon structure.

## Manuscripts in Preparation

*Absorption Spectroscopy of Neutral Yb Atoms in a Solid Ne Matrix*

C.-Y. Xu, Jaideep Singh, S.T. Pratt, H. Xu, J.C. Zappala, K.G. Bailey, Z.-T. Lu, P. Mueller, T.P. O'Connor  
in preparation

*The Development of High-Performance Alkali-Hybrid He-3 Targets for Electron Scattering*

Jaideep Singh, P.A.M. Dolph, W.A. Tobias, T. Averett, A. Kelleher, K.E. Mooney, V. Nelyubin, Yunxiao Wang, Yuan Zheng, G.D. Cates  
[arxiv:1309.4004](https://arxiv.org/abs/1309.4004) (submitted to Phys. Rev. C on 2013-09-17)

## Refereed Publications

*Measurement of the Hyperfine Quenching Rate of the Clock Transition in  $^{171}\text{Yb}$*

C.-Y. Xu, J. Singh, J.C. Zappala, K.G. Bailey, M.R. Dietrich, J.P. Greene, W. Jiang, N.D. Lemke, Z.-T. Lu, P. Mueller, T.P. O'Connor  
[Phys. Rev. Lett. 113, 033003 \(2014\)](https://doi.org/10.1103/PhysRevLett.113.033003)

*A magnetically shielded room with ultra low residual field and gradient*

I. Altarev, et al.  
[Rev. Sci. Instrum. 85, 075106 \(2014\)](https://doi.org/10.1088/0022-3778/85/7/075106)

*Efficient Tightly-Confined Trapping of  $^{226}\text{Ra}$*

R.H. Parker, M.R. Dietrich, K. Bailey, J.P. Greene, R.J. Holt, M.R. Kalita, W. Korsch, Z.-T. Lu, P. Mueller, T.P. O'Connor, J. Singh, I.A. Sulai, W.L. Trimble  
[Phys. Rev. C 86, 065503 \(2012\)](https://doi.org/10.1103/PhysRevC.86.065503)

*New Measurements of the Transverse Beam Asymmetry for Elastic Electron Scattering from Selected Nuclei*

S. Abrahamyan et al. (HAPPEX and PREX Collaborations)  
[Phys. Rev. Lett. 109, 192501 \(2012\)](https://doi.org/10.1103/PhysRevLett.109.192501)

*Magnetic decoupling of  $^{129}\text{Xe}$  nuclear spin relaxation due to wall collisions with RbH and RbD coatings*

Scott Rohrbaugh, H. T. J. Wang, J. Singh, W. A. Tobias, and G. D. Cates  
[Phys. Rev. A 86, 043413 \(2012\)](#)

*Gas dynamics in high-luminosity polarized  $^3\text{He}$  targets using diffusion and convection*

P.A.M. Dolph, J. Singh, T. Averett, A. Kelleher, K. E. Mooney, V. Nelyubin, W. A. Tobias, B. Wojtsekhowski, and G. D. Cates  
[Phys. Rev. C 84, 065201 \(2011\)](#)

*Optical Excitation and Decay Dynamics of Ytterbium Atoms Embedded in a Solid Neon Matrix*

C.-Y. Xu, S.-M. Hu, J. Singh, K. Bailey, Z.-T. Lu, P. Mueller, T. P. O'Connor, and U. Welp  
[Phys. Rev. Lett. 107, 093001 \(2011\)](#)

*Measurements of the Electric Form Factor of the Neutron up to  $Q^2 = 3.4 \text{ GeV}^2$  Using the Reaction  $^3\text{He}(\vec{e}, e'n)pp$*

S. Riordan, et al. (Jefferson Lab E02-013 Collaboration)

[Phys. Rev. Lett. 105, 262302 \(2010\)](#)

*High-Resolution Spectroscopy of  $^1_\Lambda 6\text{N}$  by Electroproduction*

F. Cusanno, et al. (Jefferson Lab Hall A Collaboration)  
[Phys. Rev. Lett. 103, 202501 \(2009\)](#)

*Quark-Hadron Duality in Neutron ( $^3\text{He}$ ) Spin Structure*

P. Solvignon, et al. (Jefferson Lab E01-012 Collaboration)  
[Phys. Rev. Lett. 101, 182502 \(2008\)](#)

*High Resolution Spectroscopy of  $^{12}_\Lambda\text{B}$  by Electroproduction*

M. Iodice, et al. (Jefferson Lab Hall A Collaboration)  
[Phys. Rev. Lett. 99, 052501 \(2007\)](#)

*Search for  $\Sigma_5^0$ ,  $N_5^0$ , and  $\Theta^{++}$  pentaquark states*

Y. Qiang, et al. (Jefferson Lab Hall A Collaboration)  
[Phys. Rev. C 75, 055208 \(2007\)](#)

*Precision Measurements of the Nucleon Strange Form Factors at  $Q^2 \approx 0.1 \text{ GeV}^2$*

A. Acha, et al. (HAPPEX Collaboration)  
[Phys. Rev. Lett. 98, 032301 \(2007\)](#)

*Constraints on the nucleon strange form factors at  $Q^2 \approx 0.1 \text{ GeV}^2$*

K. A. Aniol, et al. (HAPPEX Collaboration)  
[Phys. Lett. B 635, pp. 275–279 \(2006\)](#)

*Parity-Violating Electron Scattering from  $^4\text{He}$  and the Strange Electric Form Factor of the Nucleon*

K. A. Aniol, et al. (HAPPEX Collaboration)

[Phys. Rev. Lett. 96, 022003 \(2006\)](#)

*$Q^2$  Dependence of the Neutron Spin Structure Function  $g_2^n$  at Low  $Q^2$*

K. Kramer, et al. (Jefferson Lab Hall A Collaboration)

[Phys. Rev. Lett. 95, 142002 \(2005\)](#)

*Precision Measurement of the Weak Mixing Angle in Møller Scattering*

P. L. Anthony, et al. (SLAC E158 Collaboration)

[Phys. Rev. Lett. 95, 081601 \(2005\)](#)

*Precision measurement of the neutron spin asymmetries and spin-dependent structure functions in the valence quark region*

X. Zheng, et al. (Jefferson Lab Hall A Collaboration)

[Phys. Rev. C 70, 065207 \(2004\)](#)

*Observation of Parity Nonconservation in Møller Scattering*

P. L. Anthony, et al. (SLAC E158 Collaboration)

[Phys. Rev. Lett. 92, 181602 \(2004\)](#)

*Precision Measurement of the Neutron Spin Asymmetry  $A_1^n$  and Spin-Flavor Decomposition in the Valence Quark Region*

X. Zheng, et al. (Jefferson Lab Hall A Collaboration)

[Phys. Rev. Lett. 92, 012004 \(2004\)](#)

## **Invited Talks**

*Progress towards the search for the permanent electric dipole moment of Ra-225*

PAVI14, The 6th workshop of "From Parity Violation to Hadronic Structure and more"

July 14–July 18, 2014, Skaneateles, NY

*Progress towards the search for the permanent electric dipole moment of Ra-225*

CIPANP 2012, The 11th Conference on the Intersections of Particle and Nuclear Physics

May 29–June 3, 2012, St. Petersburg, FL

*Recent Advances in SEOP Polarized He-3 Targets*

SPIN 2008, The 18th International Symposium on Spin Physics

October 6–11, 2008, University of Virginia, Charlottesville, VA

## Colloquia & Seminars

*Trapping Atoms the "Old-Fashioned" Way: New Results & Opportunities*  
Colloquium, Department of Physics & Astronomy  
September 8, 2014, University of Tennessee, Knoxville, TN

*Opportunities in Probing Nuclei Trapped in Noble Gas Solids*  
Nuclear Science Seminar, National Superconducting Cyclotron Laboratory  
January 30, 2014, Michigan State University, East Lansing, MI

*Opportunities in Probing Nuclei Trapped in Noble Gas Solids*  
TUNL Seminar  
January 23, 2014, Triangle Universities Nuclear Laboratory, Durham, NC

*Why Is There Something Rather Than Nothing?: The Search for Time-Reversal Violation in Atoms*  
Colloquium, Department of Physics  
January 22, 2014, North Carolina State University, Raleigh, NC

*Opportunities & Challenges from Probing Atoms Trapped in Noble Gas Ice*  
Nuclear Physics Seminar, Department of Physics & Astronomy  
March 25, 2013, University of Kentucky, Lexington, KY

*Surprises and Puzzles from Probing Atoms Trapped in Noble Gas Ice*  
R.G. Herb Seminar, Department of Physics  
September 20, 2012, University of Wisconsin, Madison, WI

*Progress towards the search for the permanent electric dipole moment of Ra-225*  
Physics Division Seminar  
January 26, 2012, Oak Ridge National Laboratory, Oak Ridge, TN

*Surprises and Puzzles from Probing Atoms Trapped in Noble Gas Ice*  
AMO Seminar, Physics Department  
December 7, 2011, Northwestern University, Evanston, IL

*Surprises and Puzzles from Probing Atoms Trapped in Noble Gas Ice*  
Physics Division Seminar  
November 14, 2011, Argonne National Laboratory, Argonne, IL

*Progress Towards Polarizing and Detecting Nuclear Spins Embedded in Noble Gas Ice*  
Medium Energy Physics Seminar, Physics Division  
July 21, 2011, Argonne National Laboratory, Argonne, IL

*Exploring the Structure of the Neutron Using Laser Polarized He-3 Targets*  
Physics Division Seminar  
March 22, 2010, Argonne National Laboratory, Argonne, IL

*Laser Polarized He-3 Targets for Exploring the Structure of the Neutron*  
Medium Energy Physics Seminar, Physics Division  
July 9, 2009, Argonne National Laboratory, Argonne, IL

*Exploring the Structure of the Neutron Using Laser Polarized He-3 Targets*  
Atomic Physics Seminar, Physics Department  
May 29, 2009, Princeton University, Princeton, NJ

*Exploring the Structure of the Neutron Using Laser Polarized He-3 Targets*  
Joint AMO/Nuclear Physics Seminar, Physics Department  
May 27, 2009, Yale University, New Haven, CT

*Recent Advances in Laser Polarized He-3 Targets for Electron Scattering at JLab*  
Research Seminar  
May 26, 2009, Xemed LLC/University of New Hampshire, Durham, NH

*Exploring the Structure of the Neutron Using Laser Polarized He-3 Targets*  
Research Seminar, Center for Neutron Research  
April 28, 2009, National Institute of Standards and Technology, Gaithersburg, MD

*The GDH Sum Rule and Spin Structure of He-3 & the Neutron using Nearly Real Photons*  
Nuclear Physics Seminar, Physics Department  
April 26, 2005, University of Virginia, Charlottesville, VA