Curriculum Vitae

Masaaki Matsuda

Work address

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Education

Ph.D. in Physics, Tohoku University, Sendai, Japan, 1992
Thesis : "Magnetism and superconductivity in $La_{2-x}Sr_xCuO_4$ and (Nd, Pr) $_{2-x}Ce_xCuO_4$ studied by neutron scattering technique"
Thesis advisor: Prof. Yasuo Endoh
M.S. in Physics, Tohoku University, Sendai, Japan, 1989
B.S. in Physics, Tohoku University, Sendai, Japan, 1987

Professional experience

2021-present: Distinguished R&D Staff, Oak Ridge National Laboratory
2010-2020: Senior R&D Staff, Oak Ridge National Laboratory
2006-2010: Principal Researcher, Japan Atomic Energy Agency
2002-2006: Senior Researcher, Japan Atomic Energy Research Institute/ Japan Atomic Energy Agency
2000-2002: Researcher, Japan Atomic Energy Research Institute
1993-2000: Researcher, RIKEN (Institute of Physical and Chemical Research), Japan
1991-1993: Postdoctoral Fellow, Physics Department, Brookhaven National Laboratory
Supervisor: Dr. Gen Shirane, Sponsor: Japan Society for the Promotion of Science

Research interests:

Magnetism in strongly correlated electron systems, quantum spin systems, frustrated magnets, multiferroic systems, and high-T_C superconductors. Neutron polarization analysis and neutron scattering in high magnetic field and high pressure.

Professional activities

- In-depth experience in inelastic neutron scattering.
- Lead instrument scientist of TAS-2 (triple-axis spectrometer) at JRR-3 at JAEA (since 2000) and lead instrument scientist of HB-1 (polarized triple-axis spectrometer) at HFIR at ORNL (since 2010).
- Author or coauthor of 285 peer-reviewed refereed articles.
- h-index: 46 (Web of Science) and 51 (Google Scholar).
- Presented 24 invited lectures at international technical conferences.
- Guest scientist at RIKEN (Institute of Physical and Chemical Research), Japan (2000-2010).
- Visiting associate professor at Institute for Material Research, Tohoku University, Japan (2001).
- Executive Officer for Events of the Japanese Society for Neutron Science (2001-2003).
- Member of the Instrument Advisory Team of AMATERAS (cold neutron disk chopper spectrometer) at J-PARC since 2002-2010.
- Member of the Steering Committee for the US-Japan Cooperative Research Program on Neutron Scattering (2003-2009, 2013-present).
- Member of the Neutron Scattering Program Advisory Committee for ISSP, Univ. of Tokyo (2004-2008).

- Guest Editor of the Proceedings of the 7th International Workshop on Polarized Neutrons in Condensed Matter Investigations 2008 (PNCMI2008).
- Adjunct instructor at Department of Physics, Kyoto University, Japan (2009).
- Member of Expert Panels of Proposal Evaluation Committee (PEC) & Sub-Committees of Neutron Science Proposal Review Committee (NSPRC) for J-PARC, (2013-2021).
- Visiting professor at Institute for Material Research, Tohoku University, Japan (2014-2015).
- Visiting professor at World Research Hub Initiative, Tokyo Institute of Technology, Japan (2016-2021).

Honors and Awards

- Fellow of the American Physical Society (2018)

Editorial activity

- Associate Editor of the Journal of the Physical Society of Japan (JPSJ) (2020-present)

Conference Committees

- Local Organizing Committee Member, 7th International Workshop on Polarized Neutrons for Condensed Matter Investigations and 2nd International Symposium of Quantum Beam Science Directorate

List of 10 most significant papers

1. "Evolution of magnetic double helix and quantum criticality near a dome of superconductivity in CrAs", M. Matsuda, F. K. Lin, R. Yu, J.-G. Cheng, W. Wu, J. P. Sun, J. H. Zhang, P. J. Sun, K. Matsubayashi, T. Miyake, T. Kato, J.-Q. Yan, M. B. Stone, Qimiao Si, J. L. Luo, and Y. Uwatoko, Phys. Rev. X 8, 031017 (2018).
2. "Magnetic dispersion and anisotropy in multiferroic $BiFeO_3$", M. Matsuda, R. S. Fishman, T. Hong, C. H. Lee, T. Ushiyama, Y. Yanagisawa, Y. Tomioka, and T. Ito, Phys. Rev. Lett. **109**, 067205 (2012).
3. "Disordered Ground State and Magnetic Field-Induced Long-Range Order in an S=3/2 Antiferromagnetic Honeycomb Lattice Compound $Bi_3Mn_4O_{12}(NO_3)$", M. Matsuda, M. Azuma, M. Tokunaga, Y. Shimakawa, and N. Kumada, Phys. Rev. Lett. **105**, 187201 (2010).
4. "Universal magnetic structure of the half-magnertization phase in Cr-based spinels", M. Matsuda, K. Ohoyama, S. Yoshii, H. Nojiri, P. Frings, F. Duc, B. Vignolle, G. L. J. A. Rikken, L.-P. Regnault, S.-H. Lee, H. Ueda and Y. Ueda, Phys. Rev. Lett. **104**, 047201 (2010).
5. "Magnetic dispersion of the diagonal incommensurate phase in lightly-doped $La_{2-x}Sr_xCuO_4$", M. Matsuda, M. Fujita, S. Wakimoto, J. A. Fernandez-Baca, J. M. Tranquada, and K. Yamada, Phys. Rev. Lett. **101**, 197001 (2008).
6. "Spin-lattice instability to a fractional magnetization state in the spinel $HgCr_2O_4$", M. Matsuda, H. Ueda, A. Kikkawa, Y. Tanaka, K. Katsumata, Y. Narumi, T. Inami, Y. Ueda, and S.-H. Lee, Nature Physics **3**, 397 (2007).
7. "Electronic phase separation in lightly doped $La_{2-x}Sr_xCuO_4$", M. Matsuda, M. Fujita, K. Yamada, R. J. Birgeneau, Y. Endoh, and G. Shirane, Phys. Rev. B. **65**, 134515 (2002).
8. "Magnetic excitations and exchange interactions in the spin 1/2 two-leg ladder compound $La_6Ca_8Cu_{24}O_{41}$", M. Matsuda, K. Katsumata, R. S. Eccleston, S. Brehmer, and H.-J. Mikeska, Phys. Rev. B **62**, 8903 (2000).
9. "Magnetic order, spin correlations, and superconductivity in single crystal $Nd_{1.85}Ce_{0.15}CuO_{4+\delta}$", M. Matsuda, Y. Endoh, K. Yamada, H. Kojima, I. Tanaka, R. J. Birgeneau, M. A. Kastner, and G. Shirane, Phys. Rev. B **45**, 12548 (1992).

10. "Three-Dimensional Magnetic Structures and Rare Earth Magnetic Ordering in Nd_2CuO_4 and Pr_2CuO_4", M. Matsuda, K. Yamada, K. Kakurai, T. R. Thurston, Y. Endoh, H. Kadowaki, Y. Hidaka, R. J. Birgeneau, P. M. Gehring, A. H. Moudden, and G. Shirane, Phys. Rev. B **42**, 10098 (1990).

Editor's suggestion papers

1. "Nature of the ferromagnetic-antiferromagnetic transition in $Y_{1-x}La_xTiO_3$", S. Hameed, S. El-Khatib, K. P. Olson, B. Yu, T. J. Williams, T. Hong, Q. Sheng, K. Yamakawa, J. Zang, Y. J. Uemura, G. Q. Zhao, C. Q. Jin, L. Fu, Y. Gu, F. L. Ning, Y. Cai, K. M. Kojima, J. W. Freeland, M. Matsuda, C. Leighton, and M. Greven, Phys. Rev. B 104**,** 024410 (2021).
2. "Formation of short-range magnetic order and avoided ferromagnetic quantum criticality in pressurized $LaCrGe_3$", E. Gati, J. M. Wilde, R. Khasanov, L. Xiang, S. Dissanayake, R. Gupta, M. Matsuda, F. Ye, B. Haberl, U. Kaluarachchi, R. J. McQueeney, A. Kreyssig, S. L. Bud'ko, and P. C. Canfield, Phys. Rev. B 103, 075111 (2021).
3. "Topological singularity induced chiral Kohn anomaly in a Weyl semimetal", T. Nguyen, F. Han, N. Andrejevic, R. Pablo-Pedro, A. Apte, Y. Tsurimaki, Z. W. Ding, K. Y. Zhang, A. Alatas, E. E. Alp, S. X. Chi, J. Fernandez-Baca, M. Matsuda, D. A. Tennant, Y. Zhao, Z. J. Xu, J. W. Lynn, S. X. Huang, and M. D. Li, Phys. Rev. Lett. 124, 236401 (2020).
4. "Stability of multiferroic phase and magnetization-polarization coupling in Y-type hexaferrite crystals", V. Kocsis, T. Nakajima, M. Matsuda, A. Kikkawa, Y. Kaneko, J. Takashima, K. Kakurai, T. Arima, Y. Tokunaga, Y. Tokura, and Y. Taguchi, Phys. Rev. B 101, 075136 (2020).
5. "Unique Helical Magnetic Order and Field-Induced Phase in Trillium Lattice Antiferromagnet EuPtSi", K. Kaneko, M. D. Frontzek, M. Matsuda, A. Nakao, K. Munakata, T. Ohhara, M. Kakihana, Y. Haga, M. Hedo, T.Nakama, and Y. Ōnuki, J. Phys. Soc. Jpn, 88, 013702 (2019).
6. "Coexistence of superconductivity and short-range double-stripe spin correlations in Te-vapor annealed $FeTe_{1-x}Se_x$ ($x\leq0.2$)", Z. Xu, J. A. Schneeloch, M. Yi, Y. Zhao, M. Matsuda, D. M. Pajerowski, S. Chi, R. J. Birgeneau, G. Gu, J. M. Tranquada, and G. Xu, Phys. Rev. B 97, 214511 (2018).
7. "Origin of the net magnetic moment in $LaCoO_3$", G. M. Kaminsky, D. P. Belanger, F. Ye, J. A. Fernandez-Baca, J. Wang, M. Matsuda, and J.-Q. Yan, Phys. Rev. B 97, 24418 (2018).
8. "Magnetic structure and excitations in a multiferroic Y-type hexaferrite BaSrCo2Fe11AlO22", T. Nakajima, Y. Tokunaga, M. Matsuda, S. Dissanayake, J. Fernandez-Baca, K. Kakurai, Y. Taguchi, Y. Tokura, and T. Arima, Phys. Rev. B 94, 195154 (2016).
9. "Magnetic structure of $CuCrO_2$: a single crystal neutron diffraction study", M. D. Frontzek, G. Ehlers, A. Podlesnyak, H. Cao, M. Matsuda, O. Zaharko, N. Aliouane, S. Barilo, and S. V. Shiryaev, J. Phys.: Condens. Matter **24**, 016004 (2012).
10. "Competing magnetic ground state in nonsuperconducting $Ba(Fe_{1-x}Cr_x)_2As_2$ as seen via neutron scattering", K. Marty, A. D. Christianson, C. H. Wang, M. Matsuda, H. Cao, L. H. VanBebber, J. L. Zarestky, D. J. Singh, A. S. Sefat, and M. D. Lumsden, Phys. Rev. B **83**, 060509 (2011).
11. "Dimensional Crossover of Low-energy Magnetic Excitation for Delafossite Oxide $Cu_{1-x}Ag_xCrO_2$ with a Spin-3/2 Antiferromagnetic Triangular Sublattice", T. Okuda, T. Kishimoto, K. Uto, T. Hokazono, Y. Onose, Y. Tokura, R. Kajimoto, and M. Matsuda, J. Phys. Soc. Jpn. **78**, 013604/1-4 (2009).
12. "Longitudinal spin density wave order in a quasi-1D Ising-like quantum antiferromagnet", S. Kimura, M. Matsuda, T. Masuda, S. Hondo, K. Kaneko, N. Metoki, M. Hagiwara, T. Takeuchi, K. Okunishi, Z. He, K. Kindo, T. Taniyama and M. Itoh, Phys. Rev. Lett. **101**, 207201/1-4 (2008).
13. "Ni impurity effect on antiferromagnetic order in hole-doped $La_{2-x}Sr_xCuO_4$", H. Hiraka, T. Machi, N. Watanabe, Y. Itoh, M. Matsuda, and K. Yamada, J. Phys. Soc. Jpn. **74**, 2197 (2005).

Invited presentations at international conferences

1. "Neutron scattering studies of magnetic excitations in triangular lattice antiferromagnets", M. Matsuda, 60th REIMEI International Workshop "New excitations for spintronics seen with quantum beams", Sendai, Japan (February, 2020).
2. "Magnetic field induced transitions in multiferroic $BiFeO_3$", M. Matsuda, Summit of Materials Science 2019 and Global Institute for Materials Research Tohoku User Meeting 2019, Sendai, Japan (November, 2019).
3. "Neutron scattering study in quantum triangular lattice antiferromagnets", M. Matsuda, International workshop "Frontiers in Strongly Correlated Electron System", Sapporo, Japan (October, 2017).

4. "SpICE at ORNL", M. Matsuda, The 1st international workshop on SpICE: Controlling spectrometers all over the world, Daejeon, Korea (July, 2017).
5. "Spin-lattice coupling and novel magnetic properties in the triangular lattice antiferromagnet Ag_2CrO_2", M. Matsuda, American Physical Society March Meeting 2013, Baltimore, USA (March, 2013).
6. "Spin-lattice coupling and novel magnetic properties in the triangular lattice antiferromagnet Ag_2CrO_2", M. Matsuda, JAEA Synchrotron Radiation Research Symposium "Magnetism in Quantum Beam Science", Hyogo, Japan (March, 2013).
7. "Spin-lattice coupling and partially disordered state in a triangular lattice antiferromagnet Ag_2CrO_2", M. Matsuda, H. Yoshida, M. Isobe, C. de la Cruz, and R. S. Fishman, Workshop on Geometrically Frustrated Magnets: From Spin Ice to Kagome Planes, Natal, Brazil (December, 2011).
8. "Recent neutron scattering studies of triangular lattice antiferromagnets", M. Matsuda, The MEXT/CIFAR meeting on aspects of frustration in strongly correlated electron and spin systems, Vancouver, Canada (May, 2011).
9. "Polarized neutron studies on strongly correlated electron systems ", M. Matsuda, ICC-IMR International Workshop "Novel Material Science using Polarized Neutron", Sendai, Japan (August, 2011).
10. "Universal magnetic structure of the half-magnetization phase in Cr-based spinels", M. Matsuda, The 5th American Conference on Neutron Scattering (ACNS 2010), Ottawa, Canada (June, 2010).
11. "Universal magnetic structure of the half-magnetization phase in Cr-based spinels", M. Matsuda, K. Ohyama, S. Yoshii, H. Nojiri P. Frings, F. Duc, B. Vignolle, G. L. J. A. Rikken, L.-P. Regnault, S.-H. Lee, H. Ueda, and Y. Ueda, 6th International Symposium on High Magnetic Field Spin Science in 100T, Sendai, Japan (December, 2009).
12. "Neutron and x-ray diffraction studies of Cr-based frustrated spinel antiferromagnet" and "Neutron scattering studies of spin correlations in lightly-doped $La_{2-x}Sr_xCuO_4$", M. Matsuda , 2007 APCTP Winter Workshop on Strongly Correlated Electrons "Emergent Phenomena near Quantum Critical Points", Pohang, South Korea (January, 2007).
13. "Neutron scattering studies of spin correlations in lightly-doped $La_{2-x}Sr_xCuO_4$", M. Matsuda, 5th International Conference Stripes 2006 "Quantum Phenomena in Complex Matter" (Stripes2006), Rome, Italy (December, 2006).
14. "Magnetic Structure of Frustrated Antiferromagnets Studied by Polarized Neutron Techniques", M. Matsuda, 6th International Workshop on Polarised Neutrons in Condensed Matter Investigations 2006 (PNCMI2006), Berlin, Germany (September, 2006).
15. "Neutron and x-ray diffraction studies of a frustrated spinel antiferromagnet in high magnetic field", M. Matsuda, 8th International Conference on Research in High Magnetic Field (RHMF2006), Sendai, Japan (August, 2006).
16. "Neutron scattering study of the frustrated magnets", M. Matsuda, The 4th Korea-Japan meeting on neutron science, Tsukuba, Japan (February, 2004).
17. "Neutron scattering study of magnetic excitations in cuprates", M. Matsuda, 2003 APCTP Workshop on Magnetism Research using the Synchrotron Radiation and Neutrons, Pohang, South Korea (November, 2003).
18. "Magnetic Excitations in the Low-Dimensional Copper Oxides", M. Matsuda, International Symposium on Pulsed Neutron Science and Instruments, Tsukuba, Japan (October, 2003).
19. "Magnetic excitations in the edge-sharing CuO_2 chains", M. Matsuda, Workshop on the perspectives in Single Crystal Neutron Spectroscopy, Grenoble, France (December, 2002).
20. "Magnetic correlations in lightly-doped $La_{2-x}Sr_xCuO_4$", M. Matsuda, 12^{th} International Symposium on Superconductivity (ISS'99), Morioka, Japan (October, 1999).
21. "Incommensurate spin correlations in lightly-doped $La_{2-x}Sr_xCuO_4$", M. Matsuda, International Workshop on Magnetic Excitations in Strongly Correlated Electrons, Hamamatsu, Japan (August, 1999).
22. "Hole ordering and dimerized state in $Sr_{14}Cu_{24}O_{41}$", M. Matsuda, Workshop on Exotic Oxides, Brookhaven, USA (March, 1999).
23. "Neutron scattering studies of the quasi-one-dimensional magnet $Sr_{14}Cu_{24}O_{41}$", M. Matsuda, JST-CREST International Conference "Chemistry and Physics of Spin Ladder Compounds", Kyoto, Japan (October, 1997).
24. "Neutron scattering studies of the quasi-one-dimensional magnet $Sr_{14}Cu_{24}O_{41}$ and related compounds", M. Matsuda, International Conference on Neutron Scattering 1997 (ICNS97), Toronto, Canada (August, 1997).

Invited seminar presentations at universities

1. "Magnetic correlations in the vicinity of the superconducting state in CrAs and MnP", Quantum Materials Seminar, University of Minnesota (April 27, 2018).
2. "Helical magnetism in the vicinity of the superconducting state in CrAs and MnP", Condensed Matter Physics Seminar, Department of Physics, Iowa State University (April 20, 2017).
3. "Spin-lattice coupling and anomalous magnetic excitations in the triangular lattice antiferromagnet Ag_2CrO_2", Condensed Matter Seminar, University of Virginia (November 9, 2012).
4. "Recent neutron scattering studies on frustrated magnets", Condensed Matter Seminar, University of Virginia (September 2, 2010).

Full list of publications

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