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Position: Research Associate

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Research Interests:

oxide thin films, molecular beam epitaxy, strongly correlated materials, topological transport, photoemission spectroscopy

Research Experience:

2013.9-present Research Associate, Kawasaki Lab., the University of Tokyo, Tokyo, Japan

2012.4-2013.8 JSPS Postdoctoral Fellow for Research Abroad, Shen Lab., Cornell University, Ithaca, U.S.A.

2009.4-2012.3 JSPS Research Fellow (DC1), Tokura Lab., the University of Tokyo, Tokyo, Japan

Educational Qualification:

2009.4-2012.3 Ph. D. in Applied Physics, the University of Tokyo (supervised by Prof. Yoshinori Tokura)

2007.4-2009.3 M. S. in Applied Physics, the University of Tokyo (supervised by Prof. Yoshinori Tokura)

2003.4-2007.3 B. S. in Applied Physics, Kyoto University (supervised by Prof. Isao Tanaka)

Publications: (As of May 2018, *h*-index = 14, total citations > 700)

Review Articles

[2] “Topological Properties and Functionalities in Oxide Thin Films and Interfaces” **M. Uchida** and M. Kawasaki, *Journal of Physics D: Applied Physics* **51**, 143001 (2018).

[1] “Topological Oxide Electronics” in “The 2016 Oxide Electronic Materials and Oxide Interfaces Roadmap” **M. Uchida** and M. Kawasaki, *Journal of Physics D: Applied Physics* **49**, 433001 (2016).

Books

[1] “Spectroscopic Study on Charge-Spin-Orbital Coupled Phenomena in Mott-Transition Oxides” **M. Uchida** ISBN: 978-4-431-54296-4 (Springer-Verlag, 2013).

Original Papers

[42] “Gate-tuned quantum Hall states in Dirac semimetal $(\text{Cd}_{1-x}\text{Zn}_x)_3\text{As}_2$ ” S. Nishihaya, **M. Uchida**, Y. Nakazawa, M. Kriener, Y. Kozuka, Y. Taguchi, and M. Kawasaki, *Science Advances* **4**, eaar5668 (2018).

[41] “Controlling surface carrier density by illumination in the transparent conductor La-doped BaSnO_3 ” E. B. Lochocki, H. Paik, **M. Uchida**, D. G. Schlom, and K. M. Shen, *Applied Physics Letters* **112**, 181603 (2018).

[40] “Structural characterization of high-mobility Cd_3As_2 films crystallized on SrTiO_3 ” Y. Nakazawa, **M. Uchida**, S. Nishihaya, M. Kriener, Y. Kozuka, Y. Taguchi, and M. Kawasaki, *Scientific Reports* **8**, 2244 (2018).

[39] “Electrical conduction on the surface of ferroelectric PbTiO_3 thin film induced by electrolyte gating” R. Nishino, Y. Kozuka, **M. Uchida**, F. Kagawa, and M. Kawasaki, *Applied Physics Letters* **112**, 051602 (2018).

[38] “Electric-field control of anomalous and topological Hall effects in oxide bilayer thin films” Y. Ohuchi, J. Matsuno, N. Ogawa, Y. Kozuka, **M. Uchida**, Y. Tokura, and M. Kawasaki, *Nature Communications* **9**, 213 (2018).

[37] “All-in-all-out magnetic domain inversion in $\text{Tb}_2\text{Ir}_2\text{O}_7$ with molecular fields anti-parallel to external fields” T. C. Fujita, Y. Kozuka, J. Matsuno, **M. Uchida**, A. Tsukazaki, T. Arima, and M. Kawasaki, *Physical Review Materials* **2**, 011402(R) (2018). *Selected for Editors' Suggestion*

[36] “Quantum Hall states observed in thin films of Dirac semimetal Cd_3As_2 ” **M. Uchida**, Y. Nakazawa, S. Nishihaya, K. Akiba, M. Kriener, Y. Kozuka, A. Miyake, Y. Taguchi, M. Tokunaga, N. Nagaosa, Y. Tokura, and M. Kawasaki, *Nature Communications* **8**, 2274 (2017).

[35] “Visualizing ferroic domains in an all-in-all-out antiferromagnet thin film” Y. Kozuka, T. C. Fujita, **M. Uchida**, T. Nojima, A. Tsukazaki, J. Matsuno, T. Arima, and M. Kawasaki, *Physical Review B* **96**, 224417 (2017).

- [34] “Adsorption-controlled growth of La-doped BaSnO₃ by molecular-beam epitaxy” H. Paik, Z. Chen, E. Lochocki, A. Seidner H., A. Verma, N. Tanen, J. Park, **M. Uchida**, S. Shang, B.-C. Zhou, M. Brützam, R. Uecker, Z.-K. Liu, D. Jena, K. M. Shen, D. A. Muller, and D. G. Schlom, *APL Materials* **5**, 116107 (2017).
- [33] “Molecular beam epitaxy growth of superconducting Sr₂RuO₄ films” **M. Uchida**, M. Ide, H. Watanabe, K. S. Takahashi, Y. Tokura, and M. Kawasaki, *APL Materials* **5**, 106108 (2017).
- [32] “Alloy disorder modulated electron transport at Mg_xZn_{1-x}O/ZnO heterointerface” A. Vishnuradhan, Y. Kozuka, **M. Uchida**, J. Falson, A. Tsukazaki, and M. Kawasaki, *AIP Advances* **7**, 015029 (2017).
- [31] “Evolution of electronic correlations across the rutile, perovskite, and Ruddelsden-Popper iridates with octahedral connectivity” J. K. Kawasaki, **M. Uchida**, H. Paik, D. G. Schlom, and K. M. Shen, *Physical Review B* **94**, 121104(R) (2016).
- [30] “Evolution of Insulator-Metal Phase Transitions in Epitaxial Tungsten Oxide Films during Electrolyte-Gating” S. Nishihaya, **M. Uchida**, Y. Kozuka, Y. Iwasa, and M. Kawasaki, *ACS Applied Materials & Interfaces* **8**, 22330 (2016).
- [29] “MgZnO/ZnO heterostructures with electron mobility exceeding 1×10^6 cm²/Vs” J. Falson, Y. Kozuka, **M. Uchida**, J. H. Smet, T. Arima, A. Tsukazaki and M. Kawasaki, *Scientific Reports* **6**, 26598 (2016).
- [28] “Strain Control of Fermiology and Many-Body Interactions in Two-Dimensional Ruthenates” B. Burganov, C. Adamo, A. Mulder, **M. Uchida**, P. D. C. King, J. W. Harter, D. E. Shai, A. S. Gibbs, A. P. Mackenzie, R. Uecker, M. Bruetzam, M. R. Beasley, C. J. Fennie, D. G. Schlom, and K. M. Shen, *Physical Review Letters* **116**, 197003 (2016).
- [27] “All-in-all-out magnetic domain wall conduction in a pyrochlore iridate heterointerface” T. C. Fujita, **M. Uchida**, Y. Kozuka, W. Sano, A. Tsukazaki, T. Arima, and M. Kawasaki, *Physical Review B* **93**, 064419 (2016). *Selected for Editors’ Suggestion*
- [26] “Epitaxially Stabilized Oxide Composed of Twisted Triangular-Lattice Layers” **M. Uchida**, K. Ohba, Y. Ohuchi, Y. Kozuka, and M. Kawasaki, *Chemistry of Materials* **28**, 1165 (2016).
- [25] “Effective carrier doping and metallization in La_xSr_{2-x-y}Ba_yIrO_{4-δ} thin films” M. Ito, **M. Uchida**, Y. Kozuka, K. S. Takahashi, and M. Kawasaki, *Physical Review B* **93**, 045139 (2016).
- [24] “Direct Observation of Electrostatically Driven Band Gap Renormalization in a Degenerate Perovskite Transparent Conducting Oxide” Z. Lebens-Higgins, D. O. Scanlon, H. Paik, S. Sallis, Y. Nie, **M. Uchida**, N. F. Quackenbush, M. J. Wahila, G. E. Sterbinsky, Dario A. Arena, J. C. Woicik, D. G. Schlom, and L. F. J. Piper, *Physical Review Letters* **116**, 027602 (2016).
- [23] “All-in-all-out magnetic domain size in pyrochlore iridate thin films as probed by local magnetotransport” T. C. Fujita, **M. Uchida**, Y. Kozuka, S. Ogawa, A. Tsukazaki, T. Arima, and M. Kawasaki, *Applied Physics Letters* **108**, 022402 (2016).
- [22] “Magnetic properties of spin frustrated spinel ZnFe₂O₄ / ZnCr₂O₄ superlattices” T. Murata, Y. Kozuka, **M. Uchida**, and M. Kawasaki, *Journal of Applied Physics* **118**, 193901 (2015).
- [21] “Formation and Observation of a Quasi-Two-Dimensional d_{xy} Electron Liquid in Epitaxially Stabilized Sr_{2-x}La_xTiO₄ Thin Films” Y. F. Nie, D. Di Sante, S. Chatterjee, P. D. C. King, **M. Uchida**, S. Ciuchi, D. G. Schlom, and K. M. Shen, *Physical Review Letters* **115**, 096405 (2015).
- [20] “Field-direction control of the type of charge carriers in nonsymmorphic IrO₂” **M. Uchida**, W. Sano, K. S. Takahashi, T. Koretsune, Y. Kozuka, R. Arita, Y. Tokura, and M. Kawasaki, *Physical Review B* **91**, 241119(R) (2015). *Selected for Editors’ Suggestion*
- [19] “Band alignment and photovoltaic effect of epitaxial α -PbO thin films” E. Majima, Y. Kozuka, **M. Uchida**, M. Nakamura, and M. Kawasaki, *Applied Physics Express* **8**, 074001 (2015).
- [18] “Topological Hall effect in Heisenberg ferromagnet EuO thin films” Y. Ohuchi, Y. Kozuka, **M. Uchida**, K. Ueno, A. Tsukazaki, M. Kawasaki, *Physical Review B* **91**, 245115 (2015).
- [17] “Odd-parity magnetoresistance in pyrochlore iridate thin films with broken time-reversal symmetry” T. C. Fujita, Y. Kozuka, **M. Uchida**, A. Tsukazaki, T. Arima, and M. Kawasaki, *Scientific Reports* **5**, 9711 (2015).
- [16] “Calibration and control of in-plane Mg doping distribution in Mg_xZn_{1-x}O/ZnO heterostructures grown by molecular

beam epitaxy” **M. Uchida**, J. Falson, Y. Segawa, Y. Kozuka, A. Tsukazaki, and M. Kawasaki, *Japanese Journal of Applied Physics* **54**, 028004 (2015).

[15] “Interplay of Spin-Orbit Interactions, Dimensionality, and Octahedral Rotations in Semimetallic SrIrO₃” Y. F. Nie, P. D. C. King, C. H. Kim, **M. Uchida**, H. I. Wei, B. D. Faeth, J. P. Ruf, J. P. C. Ruff, L. Xie, X. Pan, C. J. Fennie, D. G. Schlom, and K. M. Shen, *Physical Review Letters* **114**, 016401 (2015).

[14] “Correlated vs. conventional insulating behavior in the $J_{\text{eff}} = 1/2$ vs. $3/2$ bands in the layered iridate Ba₂IrO₄” **M. Uchida**, Y. F. Nie, P. D. C. King, C. H. Kim, C. J. Fennie, D. G. Schlom, and K. M. Shen, *Physical Review B* **90**, 075142 (2014).

[13] “Atomic-scale control of competing electronic phases in ultrathin LaNiO₃” P. D. C. King, H. I. Wei, Y. F. Nie, **M. Uchida**, C. Adamo, S. Zhu, X. He, I. Božović, D. G. Schlom, and K. M. Shen, *Nature Nanotechnology* **9**, 443–447 (2014).

[12] “Evidence for Topologically Protected Surface States and a Superconducting Phase in [Ti₄](Ti_{1-x}Sn_x)Te₃ Using Photoemission, Specific Heat, and Magnetization Measurements, and Density Functional Theory” K. E. Arpino, D. C. Wallace, Y. F. Nie, T. Birol, P. D. C. King, S. Chatterjee, **M. Uchida**, S. M. Koohpayeh, J.-J. Wen, C. J. Fennie, K. M. Shen, and T. M. McQueen, *Physical Review Letters* **112**, 017002 (2014).

[11] “Extremely high electron mobility in a phonon-glass semimetal” S. Ishiwata, Y. Shiomi, M. S. Bahramy, J. S. Lee, T. Suzuki, **M. Uchida**, R. Arita, Y. Taguchi, and Y. Tokura, *Nature Materials* **12**, 512-517 (2013).

[10] “A tunable low-energy photon source for high-resolution angle-resolved photoemission spectroscopy” J. W. Harter, P. D. C. King, E. J. Monkman, D. E. Shai, Y. Nie, **M. Uchida**, B. Burganov, S. Chatterjee, and K. M. Shen, *Review of Scientific Instruments* **83**, 113103 (2012).

[9] “Pseudogap-related charge dynamics in layered-nickelate R_{2-x}Sr_xNiO₄ ($x \sim 1$)” **M. Uchida**, Y. Yamasaki, Y. Kaneko, K. Ishizaka, J. Okamoto, H. Nakao, Y. Murakami, and Y. Tokura, *Physical Review B* **86**, 165126 (2012).

[8] “Spin and charge states of Co in half-doped layered cobaltates La_{1.5}Ca_{0.5}CoO₄ and La_{1.5}Sr_{0.5}CoO₄” J. S. Lee, Hal. Q. Yamamoto, **M. Uchida**, and Y. Tokura, *Physical Review B* **86**, 045133 (2012).

[7] “Charge-gap formation in the insulating states of AV₁₀O₁₅ (A = Ba, Sr)” M. Hoshino, T. Kajita, T. Kanzaki, **M. Uchida**, Y. Tokura, and T. Katsufuji, *Physical Review B* **85**, 085106 (2012).

[6] “Orbital characters of three-dimensional Fermi surfaces in Eu_{2-x}Sr_xNiO₄ as probed by soft-x-ray angle-resolved photoemission spectroscopy” **M. Uchida**, K. Ishizaka, P. Hansmann, X. Yang, M. Sakano, J. Miyawaki, R. Arita, Y. Kaneko, Y. Takata, M. Oura, A. Toschi, K. Held, A. Chainani, O. K. Andersen, S. Shin, and Y. Tokura, *Physical Review B* **84**, 241109(R) (2011). *Selected for Editors’ Suggestion*

[5] “Thermoelectric response in the incoherent transport region near Mott transition: the case study of La_{1-x}Sr_xVO₃” **M. Uchida**, K. Oishi, M. Matsuo, W. Koshibae, Y. Onose, M. Mori, J. Fujioka, S. Miyasaka, S. Maekawa, and Y. Tokura, *Physical Review B* **83**, 165127 (2011).

[4] “Large magnetoresistance and spin-polarized heavy-mass electron state of the doped valence-bond solid (Ti_{1-x}V_x)₂O₃” **M. Uchida**, Y. Onose, and Y. Tokura, *Physical Review B* **83**, 052404 (2011).

[3] “Pseudogap of metallic layered nickelate R_{2-x}Sr_xNiO₄ (R=Nd,Eu) crystals measured using angle-resolved photoemission spectroscopy” **M. Uchida**, K. Ishizaka, P. Hansmann, Y. Kaneko, Y. Ishida, X. Yang, R. Kumai, A. Toschi, Y. Onose, R. Arita, K. Held, O. K. Andersen, S. Shin, and Y. Tokura, *Physical Review Letters* **106**, 027001 (2011).

[2] “Growth of superconducting Sr₂RuO₄ thin films” Y. Krockenberger, **M. Uchida**, K. S. Takahashi, M. Nakamura, M. Kawasaki, and Y. Tokura, *Applied Physics Letters* **97**, 082502 (2010).

[1] “Charge dynamics in thermally and doping induced insulator-metal transitions of (Ti_{1-x}V_x)₂O₃” **M. Uchida**, J. Fujioka, Y. Onose, and Y. Tokura, *Physical Review Letters* **101**, 066406 (2008).

Research Grants:

2018-2020 JSPS Grant-in-Aid for Scientific Research (B)

2016-2017 JSPS Grant-in-Aid for Scientific Research on Innovative Areas “Topological Materials Science”

2015-2016 JSPS Grant-in-Aid for Young Scientists (A)

2014-2015 JSPS Grant-in-Aid for Challenging Exploratory Research

2012-2013 JSPS Postdoctoral Fellowships for Research Abroad

2009-2011 JSPS Research Fellowships for Young Scientists

Awards:

2017 Science Poster Prize in CEMS-QPEC Symposium (Science AAAS)

2015 Ando Prize for Outstanding Young Scientists (The Foundation of Ando Laboratory)

2015 Funai Research Incentive Award (Funai Foundation for Information Technology)

2014 Inoue Research Award for Young Scientists (Inoue Foundation for Science)

2012 Springer Theses (Springer)

Other Foundation Grants:

2016 The Foundation for The Promotion of Ion Engineering Research Grant

2016 The Asahi Glass Foundation Incentive Research Grant

2016 Iketani Science and Technology Foundation Research Grant

2016 Yazaki Memorial Foundation for Science and Technology Incentive Research Grant

2015 The Thermal & Electric Energy Technology Inc. Foundation Research Grant

2015 Research Foundation for the Electrotechnology of Chubu Research Grant

2014 The Casio Science Promotion Foundation Research Grant

2014 The Murata Science Foundation Research Grant

2014 Toyota Physical and Chemical Research Institute Scholar Project

2014 Mizuho Foundation for the Promotion of Sciences Engineering Research Grant