Exponent®
Engineering & Scientific Consulting


# Rahim Ullah, Ph.D.

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## Professional Profile

Dr. Ullah is an experimental physicist with significant hands-on experience using, designing, troubleshooting, and repairing research machinery and instrumentation. He has years of experience building custom electronics from the ground up, and investigating electromechanical failures in systems involving circuit boards.

Prior to joining Exponent, Dr. Ullah completed his Ph.D in physics at the University of California, Davis under professor Valentin Taufour. As a graduate student in experimental condensed matter physics, he focused on the high-temperature growth and cryogenic characterization of single crystal ferromagnets. His research explored what happens when magnetism is suppressed. Along the way, he worked with a wide range of research instrumentation, both old and new. He analyzed numerous component-level power supply failures in a SQUID magnetometer, and made upgrades so that it could continue measuring magnetization well beyond its marketed service life. He developed spot-welding electronics to make resistivity measurements on sub-millimeter samples more reliable and tinkered with X-ray chillers, vacuum systems and furnaces. As a teaching assistant, he taught the analog and digital electronics laboratory component to physics majors for four years in a row.

## Academic Credentials & Professional Honors

Ph.D., Physics, University of California, Davis, 2023

M.S., Physics, University of California, Davis, 2018

B.S., Physics, Stanford University, 2017

## Publications


R.R. Ullah, J.S. Harvey, H. Jin, Y. Wu, H.B. Cao, J.R. Badger, P. Klavins and V. Taufour. Avoided Quantum Tricritical Point and Emergence of a Canted Magnetic Phase in LaCr1-xFexSb3. Physical Review Letters 133, 096701 (2024)

R.R. Ullah, P. Klavins, XD Zhu, and V. Taufour. Magnetic Domain Depinning as Possible Evidence for Two Ferromagnetic Phases in LaCrGe3. Physical Review B 107, 184431 (2023)

Z. Shen, X.D. Zhu, R.R. Ullah, P. Klavins, and V. Taufour. Magnetic domain walls depinning and the magnetization anomaly within the ferromagnetic phase of the Weyl semimetal Co3Sn2S2. Journal of Physics: Condensed Matter 35 (4) 045802 (2022)

X.D. Zhu, R. Ullah, V. Taufour. Oblique-incidence Sagnac Interferometric Scanning Microscope for Studying Magneto-optic Effects of Materials at Low Temperatures. Review of Scientific Instruments 92 (4), 043706 (2021)


 

Z.E. Brubaker, J.S. Harvey, J.R. Badger, R.R. Ullah, D.J Campbell, Y. Xiao, P. Chow, C. Kenney Benson, J.S. Smith, C. Reynolds, J. Paglione, R.J. Zieve, J.R. Jeffries, V. Taufour. Pressure-induced Suppression of Ferromagnetism in the Itinerant Ferromagnet LaCrSb3. Physical Review B 101, 214408 (2020)

K. Rana, H. Kotegawa, R.R. Ullah, J.S. Harvey, S.L. Bud'ko, P.C. Canfield, H. Tou, V. Taufour, Y. Furukawa. Magnetic fluctuations in the itinerant ferromagnet LaCrGe3 studied by 139La NMR. Physical Review B 99 214417 (2019)

S.I. Davis, R.R. Ullah, C. Adamo, C.A. Watson, J.R. Kirtley, M.R. Beasley, S.A. Kivelson, K.A. Moler. Spatially Modulated Susceptibility in Thin Film La2-xBaxCuO4. Physical Review B 98 014506 (2018

D. Schiessel, J.R. Kirtley, L. Paulius, A.J. Rosenberg, J.C. Palmstrom, R.R. Ullah, C.M Holland, Y.K.K. Fung, M.B. Ketchen, G.W. Gibson Jr., K.A. Moler Determining the Vibrations Between Sensor and Sample in SQUID Microscopy. Applied Physics Letters 109 232601 (2016)

**Presentations**

The unusual ferromagnetism of LaCrGe3 through the lens of magnetic domain depinning. R. Ullah, V. Taufour, X.D. Zhu, P. Klavins. Presented at March Meeting 2023 in Las Vegas.