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Min-Cheol Lee (Min Chul Lee)

POSTDOCTORAL RESEARCHER AT LOS ALAMOS NATIONAL LABORATORY

Ph.D. in Physics, **optical spectroscopy scientist** and **material scientist** with expertise in **ultrafast spectroscopy** of infrared, terahertz and X-ray lights, and multifunctional **quantum materials** including strongly correlated electron systems and topological materials.

EDUCATION

2019 **PH.D IN PHYSICS** **Seoul National University** (GPA 3.64/4.3) Seoul, South Korea
2013 **B.S IN PHYSICS** **Seoul National University** (GPA 3.70/4.3) Seoul, South Korea

STATUS

NON-IMMIGRANT VISA | H-1B | Los Alamos National Laboratory

WORK EXPERIENCE

2019 – Present **POSTDOCTORAL RESEARCHER** | **Los Alamos National Laboratory**, NM, USA
- Constructed experiments of ultrafast spectroscopy using infrared (IR), terahertz (THz), X-ray pulses – pump-probe spectroscopy, two-dimensional THz spectroscopy
- Investigated non-equilibrium dynamics of optical properties and crystal structures in superconducting and topological materials ($YBa_2Cu_3O_{6+d}$, TaAs)
- Experienced at X-ray free electron laser (XFEL) facilities at SPring8-SACLA (Japan), PAL-XFEL (South Korea) and SLAC-LCLS (USA)

2013 – 2019 **GRADUATE RESEARCH ASSISTANT** | **Seoul National University**, South Korea
- Constructed home lab near-infrared/terahertz pump-probe spectroscopic system
- Constructed experiments of X-ray absorption and photoemission spectroscopy at synchrotron facilities – PAL (South Korea), NSRRC (Taiwan)
- Investigated crystal and electronic structures coupled to magnetism in Mott insulators and superconductors (ruthenate, rhodate, iridate and pnictide)
- Thesis title: "*Non-equilibrium Spectroscopic Studies on Coherent Phonon Oscillations in Transition Metal Compounds*"

2012 – 2013 **RESEARCH INTERN** | **Seoul National University**, South Korea
- Fabricated photonic crystals by spin-coating method
- Utilized photoluminescence (PL) spectroscopy to characterize optical properties

2011 – 2012 **RESEARCH INTERN** | **Seoul National University**, South Korea
- Fabricated ZnO/GaN nanorods by MO-CVD method

SKILLS

SPECTROSCOPY **Ultrafast spectroscopy** – pump-probe technique utilizing ultrashort IR, THz and X-ray pulses | **IR spectroscopy** – Ellipsometry, FTIR | **THz spectroscopy** – THz generation/detection by optical rectification/electro-optic sampling (0.3 – 20 THz), THz time-domain spectroscopy | **X-ray spectroscopy/diffraction** – X-ray absorption/photoemission spectroscopy (XAS/XPS/ARPES), magnetic circular/linear dichroism, Resonant X-ray scattering, X-ray diffraction (XRD), time-resolved XRD, Laue diffraction

LASER **Ultrafast optical/IR laser** – optical layout design, non-linear optics, maintenance and repair of Ti:Sapphire laser oscillator/amplifier and optical parametric amplifier (OPA) | **XFEL** – experienced at SPring-8-SACLA (Japan), PAL-XFEL (South Korea), and SLAC-LCLS (USA)

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OTHER TECHNIQUES — **Ultra-high vacuum technology** | **Low-temperature technology** – liquefied He and N_2

PROGRAMMING — **MATLAB, Origin, Igor, Python** – statistical experimental data analysis and plotting, optical/physical simulations | **LabVIEW** – device control and experiment design | **VESTA** – crystal structure visualization and simulation | **Adobe Illustrator, Photoshop, Premiere** – graphic and video design

PUBLICATIONS & PRESENTATIONS

PUBLICATIONS — **16 academic publications | 6 as First Author** | google scholar
(1 Nature Materials, 1 Advance Materials, 1 Physical Review Letter, 8 Physical Review B)

SELECTED PUBLICATIONS

Advanced Materials 30, 1704777 (2018). — "Spectroscopic studies on metal-insulator transition mechanism in correlated materials" S. Y. Kim and **Min-Cheol Lee*** *et al*., (*co-1st author)

Physical Review B 99, 144306 (2019). — "Strong spin-phonon coupling unveiled by coherent phonon oscillations in Ca_2RuO_4" **Min-Cheol Lee** *et al*.

Nature Materials (in press; arXiv:2005.10308) — "Photocurrent-driven transient symmetry breaking in the Weyl semimetal TaAs" N. Sirica, P. P. Orth, M. S. Scheurer, Y. M. Dai, **Min-Cheol Lee** *et al*.

PROFESSIONAL ACTIVITIES — Journal Referee for Physical Review Letters, Physical Review B, Communications Physics

PRESENTATIONS — **8 international conferences | 1 invited talk** | selected talks are followed:

Oxide Superspin Workshop (OSS2019) — "Non-equilibrium quasiparticle dynamics in Sr_2RuO_4" Seoul, South Korea, 2019 **(invited talk)**

HONORS & AWARDS

FELLOWSHIPS

BK (Brain Korea) scholarship	Seoul National University	2013, 2018-2019
Baek-Un Fellowship	Baek-Un Scholarship Foundation	2015
GSI Fellowship	Seoul National University	2014-2015
National Science and Engineering Undergraduate Scholarship	Korea Student Aid Foundation	2009-2013

AWARDS — Outstanding Ph.D. Thesis Award in 2019 | Seoul National University
1st prize awarded in *2018 IBS Art in Science* | "A piece of femto-galaxy" (link)

SERVICE — Military service in Korea Army | Technical Research Personnel | 2016-2019

REFERENCES

Dr. Rohit Prasankumar — Technical Staff Member, Los Alamos National Laboratory, Los Alamos, NM, USA
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