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Eddwi Hesky Hasdeo

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Email : eddw001@brin.go.idHomepage : s.id/profile_hasdeo**PERSONAL**

Indonesian. Male. Married. Born in Batu, East Java (Indonesia), on January 25, 1990.

Able to speak and write in English (*fluent*) and Indonesian (*native*). Understand basic Japanese and French.**Research interests:** topological state of matter, opto-electronics, and thermoelectrics.**Specialized** in theoretical aspects of electron, photon and phonon dynamics in solids.**Practical skills:** Fortran, Mathematica, $\text{\LaTeX}$, html, Linux, user of high-performance computers.**EDUCATION AND PROFESSIONAL EXPERIENCE**

07/07/2018 – now	Researcher , National Research and Innovation Agency, Indonesia
15/01/2020 – 31/12/2024	Research Scientist , Group of Prof. T Schmidt, University of Luxembourg
09/01/2017 – 06/07/2018	Research Scientist I , Group of Dr. J Song, IHPC-A*STAR Singapore
01/10/2016 – 31/12/2016	Postdoc , Group of Prof. R Saito, Tohoku University Japan
01/10/2013 – 26/09/2016	PhD in physics , Group of Prof. R Saito, Tohoku University Japan “Gate modulated Raman spectroscopy of graphene” (13 papers)
01/10/2011 – 25/09/2013	MSc in physics , Group of Prof. R Saito, Tohoku University Japan “Electronic Raman spectroscopy of metallic carbon nanotubes” (2 papers)
01/08/2007 – 11/07/2011	BSc in physics , Brawijaya University Indonesia The best among 46 students (GPA 3.83/4)

Publication¹**First-authored and corresponding authored papers**

1. FEM Rahangiar, AB Cahaya, MS Muntini, I Anshori, **E. H. Hasdeo**, “Optimal half-metal band structure for large thermoelectric performance”, [Physical Review B 110, 035150 \(2024\)](#)
2. E.G. Idrisov[†], **E. H. Hasdeo**[†], B.N. Radhakrishnan, T.L. Schmidt, “Hydrodynamic Navier-Stokes equations in two-dimensional systems with Rashba spin-orbit coupling”, [Low Temperature Physics 49, 1385-1397\(2023\)](#).
3. J.M. Adhidewata, R.W.M. Komalig, M.S. Ukhtary, A.R.T. Nugraha, B.E. Gunara, **E. H. Hasdeo**, “Trigonal warping effects on optical properties of anomalous Hall materials”[Physical Review B 107, 155415 \(2023\)](#).
4. **E. H. Hasdeo**, E.G. Idrisov, T.L. Schmidt, “Coulomb drag of viscous electron fluids: Drag viscosity and negative drag conductivity”, [Physical Review B 107 \(12\), L121107 \(2023\)](#).
5. MS Muntini, E Suprayoga, SA Wella, I Fatimah, L Yuwana, T Seetawan, **E. H. Hasdeo**, et al. “Spin-tunable thermoelectric performance in monolayer chromium pnictides”, [Physical Review Materials 6 \(6\), 064010 \(2022\)](#).
6. A Habibi, AZ Musthofa, E Adibi, J Ekström, TL Schmidt, **E. H. Hasdeo**, “Kerr and Faraday rotations in topological flat and dispersive band structures”,[New Journal of Physics 24 \(6\), 063003 \(2022\)](#).
7. M Gaffar, SA Wella, **E. H. Hasdeo**, “ Effects of topological band structure on thermoelectric transport of bismuthene”, [Physical Review B 104 \(20\), 205105 \(2021\)](#)
8. E Suprayoga, WBK Putri, K Singsoog, S Paengson, MY Hanna, **E. H. Hasdeo**, et al. “Investigation of electron and phonon transport in Bi-doped CaMnO3 for thermoelectric applications”, [Materials Research Bulletin 141, 111359 \(2021\)](#).
9. **E. H. Hasdeo**, J Ekström, EG Idrisov, TL Schmidt, “Electron hydrodynamics of two-dimensional anomalous Hall materials”,[Physical Review B 103 \(12\), 125106 \(2021\)](#)
10. K. Oktavian, **E. H. Hasdeo**, “Non-universal scaling of thermoelectric efficiency in 3D and 2D thermoelectric semiconductors”, [Advances in Natural Sciences: Nanoscience and Nanotechnology 12 \(1\), 015017 \(2021\)](#).

¹total citations = 1227, H-index = 17, according to [Google Scholar](#) as of 22/02/2024

11. B. Rendy, **E. H. Hasdeo**, “Strain effects on band structures and Dirac nodal-line morphology of ZrSiSe”, *Journal of Applied Physics* **129**, 014306 (2021).
12. E. Suprayoga, W. B. K Putri, K. Singsoog, S. Paengson, M. Y. Hanna, A. R. T. Nugraha, D. R. Munazat, B. Kurniawan, M. Nurhuda, T. Seetawan, **E. H. Hasdeo**, “Investigation of electron and phonon transport in Bi-doped CaMnO₃ for thermoelectric applications”, *Mat. Res. Bul* **141**, 111359 (2021).
13. M. Nurhuda, A. R. T. Nugraha, M. Y. Hanna, E. Suprayoga, **E. H. Hasdeo**, “Thermoelectric properties of Mexican-hat band structures”, *Adv. Nat. Sci.: Nanosci. Nanotech.*, **11** 015012 (2020)
14. **E. H. Hasdeo**, L. P. A. Krisna, B. E. Gunara, N. T. Hung, A. R. T. Nugraha: “Optimal band gap for improved thermoelectric performance of two-dimensional Dirac materials”, *Jour. Appl. Phys.* **126**, 035109 (2019).
15. **E. H. Hasdeo**, A. J. Frenzel, J. C. W. Song: “Cyclotron motion without magnetic field”, *New J. Phys.* **21**, 083026 (2019).
16. **E. H. Hasdeo**, and J. C. W. Song: “Long-lived domain wall plasmons in gapped bilayer graphene”, *Nano Lett.* **17**, 7252-7257 (2017).
17. **E. H. Hasdeo**, A. R. T. Nugraha, M. Dresselhaus, R. Saito: “Fermi energy dependence of first-and second-order Raman spectra in graphene: Kohn anomaly and quantum interference effect”, *Phys. Rev. B* **94**, 075104 (2016).
18. **E. H. Hasdeo**, A. R. T. Nugraha, R. Saito, M. S. Dresselhaus: “Breit-Wigner-Fano lineshapes in Raman spectra of graphene”, *Phys. Rev. B* **90**, 245140 (2014).
19. **E. H. Hasdeo**, A. R. T. Nugraha, K. Sato, R. Saito, M. S. Dresselhaus: “Electronic Raman scattering and the Fano resonance in metallic carbon nanotubes”, *Phys. Rev. B* **88**, 115107 (2013).
20. **E. H. Hasdeo**, M. Nurhuda, Abdurrouf: “The Optical Low-Pass Filter Gain of a Ring Cavity”, *IJBAS-IJENS* **01**, 63-68 (2012).

Other papers

1. N Veronica, F Millah, MS Muntini, **E. H. Hasdeo**, N Amalia, SA Wella, “Strain-induced high thermoelectric performance of monolayer SnSe: a DFT study”, *Physica Scripta* **100**, 075950 (2025)
2. Ram Prakash Pandeya, Konstantin P Shchukin, Yannic Falke, Gregor Mussler, Abdur Rehman Jalil, Nicolae Atodiresei, **E. H. Hasdeo**, Alexander Fedorov, Boris V Senkovskiy, Daniel Jansen, Giovanni Di Santo, Luca Petaccia, Alexander Grüneis, “Molecular Order Induced Charge Transfer in a C60-Topological Insulator Moiré Heterostructure”, *Nano Letters* **25**, 1220 (2025)
3. EP Sinaga, MP Adams, **E. H. Hasdeo**, A Michels, “Neutron scattering signature of the Dzyaloshinskii-Moriya interaction in nanoparticles”, *Physical Review B* **110**, 054404 (2024)
4. M Ahyad, H Hardhienata, EH Hasdeo, SA Wella, F Handayasari, H Alatas, MD Birowosuto, “A Novel Sensing Method to Detect Malachite Green Contaminant on Silicon Substrate Using Nonlinear Optics”, *Micromachines* **15**, 1227 (2024)
5. E.P. Sinaga, M. Adams, M. Bersweiler, L.G. Vivas, **E. H. Hasdeo**, et al. “Micromagnetic simulation of neutron scattering from spherical nanoparticles: Effect of pore-type defects”, *Physical Review B* **107** (1), 014416 (2023)
6. JM Adhidewata, ART Nugraha, **E. H. Hasdeo**, BE Gunara, “Thermoelectrics of type-I and type-II nodal line semimetals within the two-band model”, *Indonesian Journal of Physics* **33** (1), 51-57 (2022)
7. MS Ukhtary, **E. H. Hasdeo**, AB Suksmono, ART Nugraha, “Long-lived qubit entanglement by surface plasmon polaritons in a Weyl semimetal”, *Physical Review B* **106** (15), 155409 (2022)
8. JM Adhidewata, ART Nugraha, **E. H. Hasdeo**, P Estellé, BE Gunara, “Thermoelectric properties of semi-conducting materials with parabolic and pudding-mold band structures”, *Materials Today Communications* **31**, 103737(2022)
9. J Ekström, **E. H. Hasdeo**, MB Farias, TL Schmidt, “Kerr effect in tilted nodal loop semimetals”, *Physical Review B* **104** (12), 125411 (2021)
10. G. Suwito, M. Fukuda, E. Suprayoga, **E. H. Hasdeo**, A. R. T. Nugraha, M. Sakashita, S. Shibayama, O. Nakatsuka, “Formatio of ultra-thin Ge_{1-x}Sn_x/Ge_{1-x-y}Si_xSn_y quantum heterostructures and experimental observation of resonant tunneling phenomenon”, *Appl. Phys. Lett.* **117**, 232104 (2020).
11. N. Ehlen, M. Hell, G. Marini, **E. H. Hasdeo**, R. Saito, Y. Falke, M. O. Goerbig, G. Di Santo, L. Petaccia, G. Profeta, A. Gruneis: “Origin of the flat band in heavily Cs doped graphene”, *ACS Nano* **14**, 1055 (2020).
12. M. G. Hell, N. Ehlen, B. V. Senkovskiy, **E. H. Hasdeo**, A. Fedorov†, D. Dombrowski, C. Busse, T. Michely, G. di Santo, L. Petaccia, R. Saito, and A. Gruneis: “Resonance Raman Spectrum of Doped Epitaxial Graphene at the Lifshitz Transition”, *Nano Letters*, **18** (9), 6045 – 6056 (2018) .

13. Y. Harada, M. S. Ukhtary, M. Wang, S. K Srinivasan, **E. H. Hasdeo**, A. R. T. Nugraha, G. T. Noe, Y. Sakai, R. Vajtai, P. M Ajayan, R. Saito, J. Kono: “Giant Terahertz-Wave Absorption by Monolayer Graphene in a Total Internal Reflection Geometry”, [ACS Photonics 4 121 \(2017\)](#).
14. A. R. T. Nugraha, **E. H. Hasdeo**, R. Saito: “Selective coherent phonon mode generation in single-wall carbon nanotubes”, [Jour. Phys. Cond. Matt. 29, 055302 \(2017\)](#).
15. D. Zhang, J. Yang, **E. H. Hasdeo**, C. Liu, K. Liu, R. Saito, Y. Li: “Multiple Electronic Raman Scatterings in a Single Metallic Carbon Nanotube”, [Phys. Rev. B 93, 245428 \(2016\)](#).
16. N. T. Hung, **E. H. Hasdeo**, A. R. T. Nugraha, M. Dresselhaus, R. Saito: “Quantum effects on thermoelectric power factor of low-dimensional semiconductors”, [Phys. Rev. Lett. 117, 036602 \(2016\)](#).
17. M. S. Ukhtary, A. R. T. Nugraha, **E. H. Hasdeo**, R. Saito: “Broadband Transverse Electric Surface Wave in Silicene”, [Appl. Phys. Lett. 109, 063103 \(2016\)](#).
18. X. Ling, S. Huang, **E. H. Hasdeo**, L. Liang, W. M. Parkin, Y. Tatsumi, A. R. T. Nugraha, A. A. Puretzky, P. M. Das, B. G. Sumpter, D. B. Geohegan, J. Kong, R. Saito, M. Drndic, V. Meunier, M. S. Dresselhaus: “Anisotropic Electron-Photon and Electron-Phonon Interactions in Black Phosphorus”, [Nano Lett., 16, 2260 \(2016\)](#).
19. P. Ayria, A. R. T. Nugraha, **E. H. Hasdeo**, T. R. Czank, S. Tanaka, R. Saito: “Photon energy dependence of angle-resolved photoemission spectroscopy in graphene”, [Phys. Rev. B 92, 195148 \(2015\)](#).
20. N. T. Hung, A. R. T. Nugraha, **E. H. Hasdeo**, M. S. Dresselhaus, R. Saito: “Diameter dependence of thermoelectric power of semiconducting carbon nanotubes”, [Phys. Rev. B 92, 165426 \(2015\)](#).
21. R. Saito, A. R. T. Nugraha, **E. H. Hasdeo**, S. Siregar, H. Guo, T. Yang: “Ultraviolet Raman spectroscopy of graphene and transition-metal dichalcogenides”, [Phys. Status Solidi B 252, 2363 \(2015\)](#).
22. M. S. Ukhtary, **E. H. Hasdeo**, A. R. T. Nugraha, R. Saito: “Fermi energy-dependence of electromagnetic wave absorption in graphene”, [APEX 8, 055102 -1-4, \(2015\)](#).
23. A. R. T. Nugraha, **E. H. Hasdeo**, G. D. Sanders, C. J. Stanton, R. Saito: “Origin of coherent G-band phonon spectra in single wall carbon nanotubes”, [Phys. Rev. B 91, 045406 \(2015\)](#).
24. H.-L. Liu, S. Siregar, **E. H. Hasdeo**, Y. Kumamoto, C.-C. Shen, C.-C. Cheng, L.-J. Li, R. Saito, S. Kawata: “Deep-ultraviolet Raman scattering studies of monolayer graphene thin films”, [Carbon 81, 807-813 \(2015\)](#).
25. A. R. T. Nugraha, E. Rosenthal, **E. H. Hasdeo**, G. D. Sanders C. J. Stanton, M. S. Dresselhaus, R. Saito: “Excitonic effects on coherent phonon dynamics in single wall carbon nanotubes”, [Phys. Rev. B 88, 075440 \(2013\)](#).

BOOK CHAPTER

1. R. Saito, A. R. T. Nugraha, **E. H. Hasdeo**, N. T. Hung, W. Izumida (2017), “Electronic and Optical Properties of Single Wall Carbon Nanotubes”, Topics in Current Chemistry, 375, 7 (2017), Springer, ISSN: 2365-0869 (Print) [2364-8961 \(Online\)](#).

PROCEEDINGS

1. E Suprayoga, MY Hanna, **E. H. Hasdeo**, ART Nugraha, “A comparative study of thermoelectric properties of monolayer, bilayer and bulk CrI_3 ”, [AIP Conference Proceedings 2382 \(2021\)](#).
2. NR Ayukaryana, MH Fauzi, **E. H. Hasdeo**, “The quest and hope of Majorana zero modes in topological superconductor for fault-tolerant quantum computing: An introductory overview”, [AIP Conference Proceedings 2382 \(2021\)](#).
3. **E. H. Hasdeo**, L. Krisna, A. R. T. Nugraha: “Thermoelectric properties of two-dimensional Dirac materials”, [AIP Conf. Proc 2256, 030010 \(2020\)](#).
4. E. Suprayoga, A. Rifai, A. Subhan, G. K. Sunardinanto, M. Y. Hanna, **E. H. Hasdeo**, A. R. T. Nugraha: “Ab-initio calculation of muon spin polarization function to study lithium-ion diffusion in LiTi_2O_4 battery material”, [AIP Conf. Proc. 2256, 030015 \(2020\)](#).
5. A. R. T. Nugraha, M. Y. Hanna, E. Suprayoga, **E. H. Hasdeo**: “Modulation of coherent phonon amplitudes in low-dimensional materials by ultrafast laser pulse trains”, [AIP Conf. Proc. 2256, 020005 \(2020\)](#).
6. M. Y. Hanna, **E. H. Hasdeo**, E. Suprayoga and A. R. T. Nugraha: “Thermoelectric properties of two-dimensional hydrogenated borophene: A first-principles study”, [AIP Conf. Proc. 2256, 030017 \(2020\)](#).
7. A. R. T. Nugraha and **E. H. Hasdeo**: “Coherent and squeezed phonons in single wall carbon nanotubes”, [Jour. Phys. Conf. Ser. 1191, 012002 \(2019\)](#).

SCHOLARSHIPS AND AWARDS

MEXT Scholarship for master course in Tohoku University, Japan, October 2011 - September 2013.

MEXT Scholarship for doctor course in Tohoku University, Japan, October 2013 - September 2016.

JSAP Paper Award (2017) for: Fermi energy-dependence of electromagnetic wave absorption in graphene, Journal: Appl. Phys. Express 8 (2015) 055102

GRANTS AWARDED

FNR CORE Junior, “Navier-Stokes flows in quantum materials”, Luxembourg, 370,000 EUR, 2022-01 – 2024-12
FNR CORE + DFG, “Topology in Relativistic Semimetals”, Luxembourg & Germany, 950,000 EUR, 2021 – 2024

Travel grant for to Sakon Nakhon, Thailand, “Designing quantum materials for thermoelectrics”, Indonesian Institute of Science, 90 Million IDR, 2019

Toray Science and Technology Research Grant, “Two dimensional materials simulation for advancement of thermoelectrics”, Indonesia, 25 Million IDR, 2019

DAAD Research Stay for University Academics and Scientist, “Electron-phonon interactions of two dimensional superconductors”, Cologne University, Germany, 7500 EUR, May – July 2019

Brawijaya University Research Fund, “Design of quantum materials for enhancement of thermoelectrics and solar cells efficiency”, Indonesia, 100 Million IDR, collaboration with Prof. Nurhuda 2019

WORKSHOPS AND OUTREACH

First-Principles Calculation Workshop with the Quantum ESPRESSO, Tohoku University (26/02/2016), Indonesian Computational Society (1/11/2019), Sakon Nakhon Rajabhat University, Thailand (12/2019)

Frontiers of Solid State Physics and Electronic Structure Workshops, Brawijaya University (19-21/12/2012, 14/11/2016, 26/12/2018), Malang State University (6/2019)

Workshop on Scientific Method and Writing for Natural Sciences, Selected High School Students in Merauke Regency, Papua, Indonesia (27-30/08/2019)

MENTORING ACTIVITIES

1. Rofii, BSc Airlangga University, “Nonlinear geometric photoresponses of multi-Weyl semimetals” (2024 – now)
2. Adiva Nuris Safira, BSc Airlangga University, “Effects of quantum metric in plasmonics” (2024 – now)
3. Muhammad Hafidz, BSc Airlangga University, “Nonlinear shift conductivity of CrHgTe multi-Weyl semimetal” (2024 – now)
4. Arkananta Rasendriya, BSc Bandung Institute of Technology, Indonesia, Now PhD City University of Hongkong, “AdS/CFT and chiral anomaly of Weyl semimetals” (2023 – 2025)
5. Alifaldi Ramadhan, BSc Bandung Institute of Technology, “Entropy of holographic superconductors” (2024 – now)
6. Finantius Rahangiar, BSc – MSc Gajah Mada University, “Thermoelectrics of quantum materials” (2023 – now)
7. Byjesh Radhakrishnan, PhD University of Luxembourg, “Fluctuation in electron hydrodynamics” (2022 – now)
8. Jyesta Adhidewata, BSc – MSc Bandung Institute of Technology, Indonesia, Now PhD UC Berkeley, USA, “Thermoelectrics and Optoelectronics of quantum materials” (2020 – 2022)
9. Ravanny Komalig, MSc Bandung Institute of Technology, Indonesia, Now PhD UC Berkeley, USA, “Optoelectronics of quantum materials” (2021 – 2022)
10. Marie L Zanmene, MSc University of Luxembourg “Chiral magnetic current of Weyl semimetals” (2021 – 2022).
11. Prathyush Poduval, Research Intern University of Luxembourg, Now PhD UC Irvine “Plasmonic modes at the edges of higher Chern insulators” (2021– 2022).
12. Johan Ekström, PhD University of Luxembourg, Now KPMG Luxembourg “Optical properties of nodal line semimetals” (2020 – 2021).
13. Lukas P. A. Krisna, MSc Bandung Institute of Technology, Indonesia, Now PhD Osaka University, “Thermoelectric properties of Dirac materials”(2018 – 2019)

14. Zainul Mustofa, MSc Brawijaya University, Indonesia, Now highschool teacher “Nonlinear optics of Dirac materials” (2018 – 2020)
15. Muhammad Hanna, Junior researcher BRIN, “Topological aspects of InBi Dirac semimetals” (2018 – 2020)
16. Junjung Sugiarto, BSc IPB University, Indonesia, Now PhD SKKU South Korea, “Thermoelectric properties of PbCsBr_3 perovskites” (2019 – 2020).
17. Bernandus Rendy, BSc Bandung Institute of Technology, Indonesia, Now PhD UC Berkeley, “Strain effect on nodal line semimetals”, (2019 – 2020).
18. Nur Ayukaryana, BSc Bandung Institute of Technology, Indonesia, Now PhD Tokyo University of Agriculture and Technology, Japan, “Majorana fermions and quantum computing” (2019 – 2020).
19. Muhammad Gaffar, BSc University of Indonesia, Now PhD Shanghai Jiao Tong University, China, “Thermoelectric properties of bismuthene”, , (2019 – 2020).
20. Rizqiatul Hasanah, BSc State University of Malang, Indonesia, “Thermal conductivity of 2D materials”, (2019 – 2020).
21. Galih Suwito, BSc Nagoya University, Now Postdoc University of Cambridge,UK, “Resonant tunneling quantum wells”, (2019)
22. Kevin Octavian, BSc Bandung Institute of Technology, Indonesia, Now MEng KAIST, South Korea, “Thermoelectric of 2D and 3D materials”, (2019 – 2020)

REFERENCES

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