

Abhisek Basu

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Education

Ph.D., Physics (Experimental Condensed Matter Physics)

Indian Institute of Science Education and Research, Kolkata, India – 2015

Dissertation Topic: *Perovskite oxide systems at high pressures: Raman spectroscopy and X-ray diffraction studies*

M.Sc., Physics (Major in Electronics)

University of Kalyani, India – 2009

B.Sc., Physics

University of Kalyani, India – 2007

Professional Experience

Assistant Professor (Visiting)

Department of Physics, Pacific Lutheran University, USA,
2024 – Present

Dean's Fellow/Postdoctoral Fellow

Department of Earth, Ocean, & Atmospheric Science, Florida State University, USA,
2018 – 2023

Postdoctoral Associate

Earth and Planets Laboratory, Carnegie Institution of Washington, USA,
2015 – 2018

Awards, Grants, Fellowships

Dean's Fellowship

Department of Earth, Ocean & Atmospheric Science, Florida State University, 2018 -
2020

Undergraduate Research Opportunity Program Material Grant

Florida State University, 2018-2020

Postdoctoral Travel Award to attend AGU Fall Meeting, 2019

Florida State University, 2019

Teaching Experience

Pacific Lutheran University, Tacoma, WA, USA, (2024 – present)

Instructor, *College Physics I*

PHYS 125: Introductory algebra-based mechanics.

Instructor, *College Physics II*

PHYS 126: Introductory algebra-based electricity & magnetism/optics.

Instructor, *General Physics II*

PHYS 154: Introductory calculus-based electricity & magnetism/optics.

Instructor, *College/General Physics Lab*

PHYS 135/136/163/164: Introductory physics labs (4 sections)

Florida State University, Tallahassee, FL, USA, (2020)

Instructor, *Physical Geology*

GLY2010C: Introductory Earth Science (2 semesters)

Indian Institute of Science Education and Research, Kolkata, India, (2009 – 2010)

Teaching Assistant, *Integrated MS-BS Physics Lab* (2 semesters)

Students Mentored

Primary Advisor

FSU-Direct Individual Study

Morgan Dansby – 2021

FSU-Undergraduate Research Opportunity Program

- *Christina Schiffert – 2019-2020*

- *Christelle Bucag – 2019-2020*

- *Patrick Murphy – 2018-19*

Co-Advisor

FSU-Undergraduate Research Opportunity Program

- *Emily Wilder – 2022-2023*

FSU-Direct Individual Study

- *Marissa Miller – 2022*

- *Stephen Clapp – 2021-2022*

- *Ericka McMahan – 2021*

- *Vlada Filippova – 2019*

Carnegie Institution

- *Thomas Shiell – 2016*

Professional Service

- PLU: Service to department, campus, and physics profession.

- FSU: Postdoctoral Travel Award Reviewer and Panel Member, 3 panels

- Peer reviewer for *Journal of Applied Physics*, *Applied Physics Letters*, *Solid State Communications*, *Scientific Reports*, *American Mineralogist*, *Earth and Planetary Science Letters*, *Geochemical Perspective Letters*, *Geoscience Frontiers*, *Minerals*, *ACS Earth & Space Chemistry*

Conference, & Seminars

• GSA Connects 2022

Denver, CO, USA, October 2022

Talk: *High-pressure behavior of layered hydrous minerals (Co-authored)*

• AGU Fall Meeting 2021

New Orleans, LA, USA, December 2021

Poster - *Compression behavior of kaolinite (Co-authored)*

• APS March Meeting 2021

Virtual, March 2021

Talk - *High pressure-temperature behavior of long-chain alkanes.*

• 17th International Symposium on Experimental Mineralogy, Petrology and Geochemistry 2021

Virtual, March 2021

Talk - *High-Pressure behavior of 3.65 Å Hydrous Phase*

• AGU Fall Meeting 2020

Virtual, December 2020

Poster - *High pressure behavior of layered hydrous silicate, kaolinite.*

• AGU Fall Meeting 2019

San Francisco, California, USA, December 2019

Poster - *Understanding water intercalation in layered silicates.*

- **AGU Fall Meeting 2018**

Washington, DC, USA, December 2018

Poster - *Brucite at high pressures*

Poster - *Low thermal conductivity of the outer core.*

- **APS March Meeting 2017**

New Orleans, LA, USA, March 2017

Talk - *Determination of melting curves of metals from resistance changes in the LHDAC.*

- **Gordon Research Conference, High Pressure Research**

Holderness, NH, USA, July 2016

Poster - *Melting of iron.*

- **EFree Neutron Day Meeting**

Oak Ridge National Laboratory, Oak Ridge, TN, USA, December 2015

Publications

Students mentored

Peer-Reviewed Publication

- [18] **A. Basu**, M. Mookherjee, S. Clapp[#], S. Chariton, and V. Prakapenka, High-pressure Raman scattering and X-ray diffraction study of kaolinite, $\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$, *Applied Clay Science* **245** (2023) 107144.
- [17] **A. Basu**, M. Mookherjee, C. Bucag[#], S. Tkachev, and B. Wunder, High-pressure behavior of 3.65 Å phase: Insights from Raman spectroscopy, *American Mineralogist* **108** (2023) 1547.
- [16] **A. Basu**, M. Mookherjee, E. McMahan[#], B. Haberl, and R. Boehler, Behavior of long-chain hydrocarbons at high pressures and temperatures, *J. Phys. Chem. B* **126** (2022) 2530.
- [15] **A. Basu** and M. Mookherjee, Intercalation of water in kaolinite ($\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$) at subduction zone conditions: Insights from Raman Spectroscopy, *ACS Earth & Space Chemistry* **5** (2021) 834.
- [14] **A. Basu**, M. Mookherjee, C. Schiffert[#], B. Haberl, and R. Boehler, Spectroscopic investigation of the high pressure behavior of aliphatic hydrocarbon: Implications for planetary processes, *ACS Earth & Space Chemistry* **5** (2021) 449.
- [13] **A. Basu**, P. Murphy[#], M. Mookherjee, B. Haberl and R. Boehler, High pressure behavior of a linear chain tricosane, *J. Appl. Physics* **127** (2020) 105901.
- [12] **A. Basu**, M. Field, D. McCulloch and R. Boehler, New measurement of melting and thermal conductivity of iron close to outer core conditions, *Geoscience Frontiers* **11** (2020) 565.
- [11] T. Shiell[#], C. de Tomas, D. G. McCulloch, D. R. McKenzie, **A. Basu**, I. Suarez-Martinez, N. A. Marks, R. Boehler, B. Haberl, and J. E. Bradby, In situ analysis of the structural transformation of glassy carbon under compression at room temperature, *Phys. Rev. B* **99** (2019) 024114.
- [10] D. Pradhan, A. Mishra, S. Kumari, **A. Basu**, M. Somyazulu, E. Graduaskaite, R. Smith, J. Gardner, P. Turner, A. N'diaye, M. Holcomb, R. Katiyar, P. Zhou, G. Srinivasan, J. Gregg, J. F. Scott, Studies of Multiferroic Palladium Perovskites, *Scientific Reports* **9** (2019) 1685.

- [9] **A.Basu**, M.Ahart, N.Holtgrewe, C.Lin, and R.Hemley, Pressure induced transformation of multiferroic relaxor $\text{PbFe}_{0.5}\text{Nb}_{0.5}\text{O}_3$, *J. Appl. Phys.* **123** (2018) 084102.
- [8] R.Jana, P.Saha, V.Pareek, **A.Basu**, S.Kapri, S.Bhattacharya, G.D.Mukherjee, High Pressure Experimental Studies on CuO : Indication of Re-entrant Multiferroicity at Room Temperature, *Scientific Reports* **6** (2016) 31610.
- [7] **A.Basu**, R.Jana, R.Ranjan and G.D.Mukherjee, Pressure Effects on Model Ferroelectric $\text{BiFeO}_3\text{-PbTiO}_3$: Multiple Phase Transitions, *Phys. Rev. B* **93** (2016) 214114.
- [6] **A.Basu**, R.Jana, G.Mandal, A.Chandra and G.D.Mukherjee, Pressure driven ferroelectric to paraelectric transition in Sr doped BaTiO_3 , *J. Appl. Phys.* **117** (2015) 054102.
- [5] D.Majumdar, **A.Basu**, G.D.Mukherjee, D.Ercolani, L.Sorba, A.Singha, Raman scattering study of InAs nanowire under high pressure, *Nanotechnology* **25** (2014) 465704.
- [4] G.Mandal, **A.Basu**, G.D.Mukherjee, Raman spectroscopy and X-ray diffraction studies on 9R-BaRuO_3 at high pressures: Evidence of electronic topological transition. *Mater. Res. Express* **1** (2014) 035701.
- [3] **A.Basu** and G.D.Mukherjee, Phase transitions in Eu doped BiFeO_3 : High pressure Raman spectroscopy and X-ray diffraction studies, *Solid State Communications* **189** (2014) 5.
- [2] **A.Basu**, A.Chandra, A.K.Tyagi and G.D.Mukherjee, Reappearance of ferroelectric soft modes in the paraelectric phase of $\text{Pb}_{1-x}\text{Ca}_x\text{TiO}_3$ at high pressures: Raman and x-ray diffraction studies, *J. Phys.: Condens. Matter* **24** (2012) 115404 (*Selected in Institute of Physics' National Science Day collections*).
- [1] **A.Basu**, S.Paul, M.Polentarutti, G.Bais, S.Oishi, S.Raj and G.D.Mukherjee, High pressure investigations of $\text{Na}_{0.025}\text{WO}_3$: X-ray diffraction and Raman spectroscopy studies, *J. Phys.: Condens. Matter* **23** (2011) 365401.