

# Abhisek Basu

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## Education

### Ph.D. in 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. in Physics (Major in Electronics)

University of Kalyani, India – 2009

## Professional Experience

### Postdoctoral Fellow

Department of Earth, Ocean, & Atmospheric Science, Florida State University, USA, January 2021 – December 2023

### Dean's Fellow

Department of Earth, Ocean, & Atmospheric Science, Florida State University, USA, May 2018 – December 2020

### Postdoctoral Associate

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

## Awards, Grants, Fellowships, & Offers

### Tenure-track Assistant Professor

School of Biological and Physical Science, Northwestern State University, University of Louisiana System, Louisiana, 2022

### 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

### Senior Research Fellowship

Council of Scientific and Industrial Research-India, 2013 -15

## Teaching Experience

### Physical Geology, GLY2010C

Instructor – Florida State University

*Responsibility: Developed course material and delivered two weekly 75 minutes lectures for two semesters to 45 students from diverse academic backgrounds. Developed and graded midterm and final tests, quizzes, and assignment questions.*

### Physics Laboratory, Integrated MS-BS

Teaching Assistant, Indian Institute of Science Education and Research – Kolkata

*Responsibility: Conducted an undergraduate physics lab for 20 students. Developed assignment questions, guided discussion sections, and graded tests.*

## 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, 2016

*Thomas Shiell*

## Professional Service

• 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*

• Member of *American Geophysical Union, American Physical Society, Mineralogical Society of America*

• Member of *National Postdoctoral Association, USA*

## 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

## Articles in Progress

### Publications

# Students mentored

- [22] **A.Basu**, and M.Mookherjee, Revised estimates of the role of super-hydrated clays on Earth's deep-water cycle, (*In preparation*).
- [21] **A.Basu**, V. Filippova<sup>#</sup>, and M.Mookherjee, Pressure-induced transitions in Albite: Geophysical Implications, (*In preparation*).
- [20] Y. Peng<sup>#</sup>, **A. Basu**, M. Mookherjee, D. Wang, and G. Manthilake, Thermodynamics of tremolite: Insight from high pressure Raman spectroscopy, (*In preparation*).
- [19] D. Pradhan, S. Kumari, M. M. Rahaman, A. Mishra, **A. Basu**, D. Pradhan, A. Kumar, S. Kojima, R. Katiyar, and P. Rack, Fano Resonance and Pressure-induced Phase Transitions in Palladium-PZT Room Temperature Multiferroic Material, (*Communicated*).

### Peer-Reviewed Publication

- [18] **A. Basu**, M. Mookherjee, S. Clapp<sup>#</sup>, 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<sup>#</sup>, 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<sup>#</sup>, 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<sup>#</sup>, 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<sup>#</sup>, 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<sup>#</sup>, 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  $\text{BaTiO}_3$ , *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  $9\text{R-BaRuO}_3$  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  $\text{BiFeO}_3$ : 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.