



Felix O. Saouma, PhD

Physics Lecturer
School of Science, Computing & Informatics
Department of Physical Sciences
Kaimosi Friends University College

Address

Kaimosi Friends University College
P.O. Box: 385-50309, Kaimosi, Kenya.

Contact

Email: fsaouma@kafuco.ac.ke
Tel: +254741403078, +254736317697

RESEARCH INTERESTS

Highly skilled in nonlinear optical characterization of semiconductor materials using tunable laser system and optical spectroscopic techniques. I have been productively involved in cutting edge research opportunities and in turn contributed immensely in the characterization of nonlinear optical properties of novel materials. My current research interest spans across;

- ✚ Computational study of electronic structure properties of novel nonlinear optical materials using Density Functional Theory.
- ✚ Nonlinear optical properties of emerging perovskite solar cell materials.
- ✚ Nonlinear optical responses of chalcogenides and multiferroic materials in the mid-infrared (IR) frequencies.

EDUCATIONAL BACKGROUND

Lecturer and Researcher at the Department of Physical Sciences within the School of Science, Computing & Informatics (SOSCI) at Kaimosi Friends University College (KAFUCO), a constituent college of Masinde Muliro University of Science & Technology (MMUST). PhD graduate from State University of New York (SUNY) at Binghamton, 2017. Dissertation title; “**Nonlinear optical properties of emerging perovskite solar cell materials**”. B.Ed (Science) graduate from Kenyatta University (KU), 2008.

COLLABORATORS

1. Dr. George Simiyu Manyali
Computational and Theoretical Physics Group (CTheP)
Physics Department, Masinde Muliro University of Science and Technology
P. O. BOX: 190-50100, Kakamega, Kenya
2. Dr. Calford O. Otieno
Department of Physics, Kisii University
P.O. Box: 408-40200, Kisii, Kenya

PEER REVIEWED JOURNALS

- [1] “Crystal structure and second harmonic generation in Bi_2TeO_5 : An X-N study from synchrotron and neutron diffraction data”, C. A. Lopez, E. Baati, M. T. Fernandez-Diaz, **F. O. Saouma**, J. I. Jang, J. A. Alonso, Journal of Solid State Chemistry [In Press, Accepted Manuscript \(2019\)](#).
- [2] “Phase transitions of formamidinium lead iodide perovskite under pressure”, S. Jiang, Y. Luan, J. I. Jang, T. Baikie, X. Huang, R. Li, **F. O. Saouma**, Z. Wang, T. J. White, and J. Fang, [J. Am. Chem. Soc. 140, 13952 \(2018\)](#).
- [3] “Structural and spectroscopic properties of the polar antiferromagnet $\text{Ni}_2\text{MnTeO}_6$ ”, M. Retuerto, S. Skiadopouou, F. Borodavka, C. Kadlec, F. Kadlec, J. Prokleska, Z. Deng, J. A. Alonso, M. T. Fernandez-Diaz, **F. O. Saouma**, J. I. Jang, D. Legut, S. Kamba, and M. Greenblatt, [Phys. Rev. B. 97, 144418 \(2018\)](#).
- [4] “Selective enhancement of optical nonlinearity in two-dimensional organic-inorganic lead iodide perovskites”, **F. O. Saouma**, C. C. Stoumpos, J. Wong, M. G. Kanatzidis, and J. I. Jang, [Nat. Com. 8, 742 \(2017\)](#).
- [5] “Multiphoton absorption order of CsPbBr_3 as determined by wavelength-dependent nonlinear optical spectroscopy”, **F. O. Saouma**, C. C. Stoumpos, M. G. Kanatzidis, Y. S. Kim, and J. I. Jang, [J. Phys. Chem. Lett. 8, 4912 \(2017\)](#).
- [6] “Multiphoton absorption coefficients of organic-inorganic lead halide perovskites $\text{CH}_3\text{NH}_3\text{X}_3$ (X = Cl, Br, I)”, **F. O. Saouma**, D. Park, S. H. Kim, M. S. Jeong, and J. I. Jang, [Chem. Mater. 29, 6876 \(2017\)](#).
- [7] “Polarization-selective three-photon absorption and subsequent photoluminescence in CsPbBr_3 single crystal at room temperature”, D.J. Clark, C. C. Stoumpos, **F. O. Saouma**, M. G. Kanatzidis, and J.I. Jang, [Phys. Rev. B. 93, 195202 \(2016\)](#).
- [8] “Phase transition, conformational exchange, and nonlinear optical third harmonic generation of the $[\text{P}_2\text{Se}_8]^{2-}$ anion”, A. S. Haynes, A. Bannerjee, **F. O. Saouma**, C. O. Otieno, J.I. Jang, and M. G. Kanatzidis, [Chem. Mater. 28, 2374 \(2016\)](#).
- [9] “Low-temperature cationic rearrangement in a bulk metal oxide”, M.-R. Li, M. Retuerto, P.W. Stephens, M.C. Croft, S. Baidya, T. Saha-Dasgupta, D. Sheptyakov, V. Pomjakushin, Z.

Deng, H. Akamatsu, V. Gopalan, J. Sanchez-Benitez, **F. O. Saouma**, J.I. Jang, D. Walker, and M. Greenblatt, [Angew. Chem. Int. Ed. **55**, 9862 \(2016\)](#)

[10] “Phase-change behavior and nonlinear optical second and third harmonic generation of the one-dimensional $K_{1-x}Cs_xPSe_6$ and metastable beta- $CsPSe_6$ ”, A. S. Haynes, **F. O. Saouma**, C. O. Otieno, D.J. Clark, D. P. Shoemaker, J.I. Jang, and M. G. Kanatzidis, [Chem. Mater. **27**, 1837 \(2015\)](#).

[11] “ Mn_2FeWO_6 a new Ni_3TeO_6 -type polar and magnetic oxide”, M.-R. Li, M.C. Croft, P.W. Stephens, M. Ye, D. Vanderbilt, M. Retuerto, Z. Deng, C. P. Grams, J. Hemberger, J. Hadermann, W.-M. Li, C.-Q. Jin, **F. O. Saouma**, J.I. Jang, H. Akamatsu, V. Gopalan, D. Walker and M. Greenblatt, [Adv. Mater. **27**, 2177 \(2015\)](#).

[12] “Evidence from room temperature electric polarization in RMn_2O_5 multiferroic”, V. Baledent, S. Chattopadhyay, P. Fert, M.B. Lepetit, M. Greenblatt, B. Wanklyn, **F. O. Saouma**, J.I. Jang, and P. Foury-Leylekian, [Phys. Rev. Lett. **114**, 117601 \(2015\)](#).

[13] “Semiconducting properties and phase-matching nonlinear optical response of the one-dimensional selenophosphates ANb_2PSe_{10} ($A=K, Rb, \text{ and } Cs$)”, J. C. Syrigos, D. J. Clark, **F. O. Saouma**, S. M. Clarke, L. Fang, J. I. Jang, and M. G. Kanatzidis, [Chem. Mater. **27**, 255 \(2015\)](#).

[14] “Magnetic-structure-stabilized polarization in an above-room-temperature ferrimagnet”, M.-R. Li, M. Retuerto, D. walker, T. Sarkar, P.W. Stephens, S. Mukherjee, T.S. Dasgupta, J. P. Hodges, M.C. Croft, C. P. Grams, J. Hemberger, J. Sanchez-Benitez, A. Huq, **F.O. Saouma**, J. I. Jang, and M. Greenblatt, [Angew. Chem. Int. ED. **53**. 10774 \(2014\)](#).

[15] “Impact of two-photon absorption on second harmonic generation in CdTe as probed by wavelength-dependent Z-scan nonlinear spectroscopy”, J. I. Jang, S. Park, D.J. Clark, **F. O. Saouma**, D. Lombardi, C. M. Harrison, and B. Shim, [J. Opt. Soc. Am. **30**, 2292 \(2013\)](#).

[16] “Broadband studies of the strong mid-infrared nonlinear optical responses of $KPSe_6$ ”, J. I. Jang, A. S. Haynes, **F. O. Saouma**, C. O. Otieno, and M. G. Kanatzidis, [Opt. Mater. Express **3**, 1302 \(2013\)](#) - **Special Issue: Mid-IR photonic materials**.

CONFERENCE PAPERS

[1] “The effect of grain improvement on carrier lifetime in perovskite solar devices”, D. Fisher, **F. O. Saouma**, J. I. Jang, T. P. Dhakal, [Photovoltaic Specialists Conference \(PVSC\), 2016 IEEE 43rd, 0768-0772](#).

INTERNATIONAL CONFERENCES

[1] “Enhancing nonlinear optical response by optimizing the structure of noncentrosymmetric chalcogenides”, A. S. Haynes, C. O. Otieno, **F. O. Saouma**, L. Frazer, J. B. Ketterson, J. I. Jang, and M. G. Kanatzidis, Presented at the 246th ACS National Meeting, Indianapolis, Indiana, September 8-12, (2013) INOR-506.

[2] “*1D selenophosphates and their nonlinear optical properties*”, A. S. Haynes, C. O. Otieno, **F. O. Saouma**, J. I. Jang, and M. G. Kanatzidis, Presented at the 248th ACS National Meeting, San Francisco, California, August 10-14, (2014) INOR-566.

[3] “*Nonlinear optical second and third harmonic generation of the one-dimensional $K_{1-x}Cs_xPSe_6$ and metastable β -CsPSe₆*”, A. S. Haynes, **F. O. Saouma**, C. O. Otieno, D. J. Clark, J. I. Jang, and M. G. Kanatzidis, Presented at the North American Solid State Chemistry Conference, Tallahassee, Florida, May 22-24, (2015).

[4] “*The effect of grain boundaries on carrier lifetime in perovskite solar devices*”, D. Fisher, **F. O. Saouma**, J. I. Jang, and Tara P. Dhakal, Photovoltaic Specialists Conference (PVSC), Portland, Oregon (2016).

[5] “*New polar and magnetic corundum-type oxides, $A_2BB'O_6$ high pressure synthesis*”, Martha Greenblatt, Manrong Li, Maria Retuerto, Zheng Deng, Mark Croft, David Vanderbilt, Meng Ye, Peter Stephens, Joke Hadermann, David Walker, Joachim Hemberger, Christoph Grams, Chang-Qing Jin, Wen-Min Li, Joon Jang, **Felix O. Saouma**, Venkatraman Gopalan, and Hirofumi Akamatsu, Presented at the 250th ACS National Meeting, Boston, August 16-20, (2015).

INTERNATIONAL WORKSHOPS

[1] “*5th African School on Electronic Structure Methods and Applications (ASESMA-2018)*” 22 October – 2 November 2018, Addis Ababa Science & Technology University (AASTU), Addis Ababa-Ethiopia. Role: Participant. <http://indico.ictp.it/event/8354/>

LOCAL WORKSHOPS

Laboratory Equipment Grant Proposal Writing, Tom Mboya Labour College, Kisumu-Kenya. Role: Participant.

INVITED TALKS

“Broadband nonlinear optical properties of $K_{1-x}Cs_xPSe_6$ ($0 \leq x < 1$)” [Chemistry colloquium, State University of New York at Binghamton, New York \(2014\).](#)

Nonlinear optical processes & materials and their corresponding applications” Department of Physics colloquium, Multimedia University of Kenya (MMU), Nairobi-Kenya (2017).

HONORS AND AWARDS

K. Keith Innes Summer Research Grant recipient, **May 2014**. State University of New York at Binghamton.

Graduate Assistant/Teaching Assistant (GA/TA) Fellowship (**2011-2017**). State University of New York at Binghamton.