Nuclear and Surface Physics Group

This is the page of the Nuclear and Surface Physics Group, a multidisciplinary research facility located in the Physics Department of the University of Texas at El Paso, the experimental facilities are located in Room 129 of the Physical Science Building.

The Nuclear and Surface Physics Group services mainly for academic research at UTEP bridging departments in interdisciplinary studies. It houses a wide variety of state-of-the-art multidisciplinary instrumentation supported by a team of dedicated experienced staff.

The main activities of the Group are:

- Experimental research on X-Ray Photoelectron Spectroscopy, Auger Spectroscopy, UV Spectroscopy, X-Ray Fluorescence, production of thin films by Physical Vapor deposition, detection of underground radon
- Theoretical research on Neutrino oscillations, Heavy ion reactions, Nuclear matter, Nuclear pasta, Neutron star crusts, Neutron-rich matter, Isoscaling, Nuclear equation of state, Nuclear symmetry energy,
- Incorporation of graduate, undergraduate and high school students in research.

For more information of Nuclear Physics Research click here, and for more information of XPS Research click here.

**EQUIPMENT**

- PHI 5600 XPS X-ray photoelectron Spectrometer-2
- Orion 5 Thin film sputtering
- X-MET 3000 Handheld X-Ray Fluorescence
- MARKUS 10 Underground radon gas detector

**SOFTWARE**

- Molecular dynamics
- GEANT 4
- PyMCA (see instructions here)
- Neutrino Oscillations

**WEB PAGES**

- Nuclear Physics Wiki Page
- MASE 6402 and MME 5401 Wiki Page
- Physics Department Nuclear and Surface Physics page
- XRF study of Pueblo Indian pottery

**CURRENT STUDIES**

- XPS (Enrique Ramirez-Homs and Yahir Garay)
- Underground radon detection (German Rodriguez, Israel Chavarría and Roberto Soto)
- Molecular dynamics (Enrique Ramirez-Homs)
- Neutrino oscillations (Karla Rosita Tellez-Girón Flores)
- Geant 4 (Omar Hernández Rodriguez and Selim Romero González)
PRESENT COLLABORATORS

- Dr. Jason Holmes, Arizona State University
- Dr. Carlos Díaz Moreno
- Dr. Claudio Dorso, Universidad de Buenos Aires, Argentina
- Dr. Sergio Terrazas Porras, Universidad Autónoma de Cd. Juárez
- Dr. Diedra Hodges, ECE, UTEP

PRESENT STUDENTS

- Yahir Garay
- Víctor Manuel Lizarraga Rubio (U. A. Sinaloa)
- Adrián Gaytán Terrazas
- Gicela Saucedo Gómez
- Enrique Ramírez-Homs
- Omar Hernández Rodríguez
- Selim Romero González
FORMER STUDENTS

- Alan Salcedo (Summer 2016 - Spring 2017)
- Jeremiah Lopez (Summer 2017)
- Andrea Valdez Rivas (Summer 2017)
- Karla Rosita Tellez-Girón Flores, 2015-2017, Nuclear theory
- Nazia Sharmin, 2015-2017, XRF, XPS
- Víctor Manuel Lizarraga Rubio (Universidad Autónoma de Sinaloa), Summer 2017, Nuclear theory
- Jeremiah Lopez, Summer 2017, XPS
- Andrea Valdez Rivas, high school scholar, Summer 2017, XPS
- Rodolfo Gonzalez, 2013, Nuclear theory
- Jorge Muñoz, 2007-2010, Nuclear theory
- Alán Dávila, 2007-2010, Nuclear theory
- Miguel Bencomo, 2010-2012, XPS
- Federico López, 2009-2011, XPS/AES
- Sergio Yanuen Rodriguez, XPS/AES

FORMER COLLABORATORS

- Dr. Oscar Dena, Univ. Autónoma de Cd. Juárez
- Dr. Laszlo Sajo-Bohus, Universidad Simon Bolivar, Venezuela
- Dr. Miguel Castro-Colín, Bruker, Germany
- Bill Durrer
- Alberto Duarte Moller (CIMAV)

RECENT PUBLICATIONS

Published

- "Multiferroic and Optical Properties of La0.05Li0.85NbO3 and LiNbO3 Nanocrystals”, C.A. Diaz-Moreno, Jorge A. López, et al., J. Nanotechnology, 3721095, 2018. See article here.


"Relaxor ferroelectricity, ferromagnetic and optical second harmonic properties in lanthanum lithium niobate (La$_{0.05}$Li$_{0.85}$NbO$_3$) nanoparticles", C. Diaz Moreno et al., J. Magnetism and Magnetic Mater., 433, (2017) 262–270. See article here.


"Effect of an electron gas on a neutron-rich nuclear pasta", with Enrique Ramírez-Homs, in Nuclear Science and Techniques (China), V. 26, P. S20502, 2015; see article here.


For a complete list of publication see the curriculum vitae of Dr. Jorge A. Lopez.

**RECENT ACTIVITIES**

2017

- **Dec. 15:** My former students were featured in the College of Science Fall 2017 e-Newsletter, Karla Rosita Téllez-Girón Flores in page 4, and Alan Salcedo in page 17.
- **Dec. 12:** Received the 2017 Best Thesis Research Mentoring Award, at the UTEP College of Science winter Pre-Commencement Ceremony, for work with Karla Rosita Tellez-Giron Flores. See diploma here.
- **Nov. 18-25:** Visiting Claudio Dorso at the University of Buenos Aires.
- Nov. 9-11: Guest Carlos Bertulani, Texas A&M Commerce. See about Carlos's research here. On Nov. 9 Carlos delivered a lecture in my Astronomy class "Nucleosynthesis", and on Nov. 10 he presented the Physics Seminar "Non-extensive statistics solution of the cosmological lithium problem". He was also interviewed by Science Studio.
- Sep. 20: Physics Colloquium, "Italian delicacies served up in a neutron star crust", at Notre Dame University. See announcement here, see pictures from Notre Dame University here.
- Sep. 6-9: Guest Jason Holmes, Arizona State University. See about Jason's research here. On Sep. 8 Jason gave the Physics Seminar "Next Generation detectors for proton therapy quality assurance".
- Aug. 4: Thesis Defense, of my M.S. student Germán Rodríguez; "Using underground radon to detect inactive geological faults".
- Aug. 3: Thesis Defense, of my M.S. student Enrique Ramírez-Homs; "Electron gas and neutron star crusts".
- Aug. 2: Thesis Defense, of my M.S. student Karla Rosita Téllez-Girón Flores; "Neutrino oscillations and the RENO experiment".
- July 26: Thesis Defense, of my M.S. student Nazia Sharmin; "Time degradation of perovskites".
- June 5 - Aug. 4: Summer guest Víctor Manuel Lizárraga Rubio, from Universidad de Sinaloa, working on project "Neutron diffusion".
- June 12 - Aug. 18: Summer guests Andrea Valdez-Rivas, from Franklin High School, working on project "XPS study of materials".
- June 5 - Aug. 4: Summer guest Jeremiah Lopez, from UTEP, working on project "XPS study of Maya Blue", see poster here.
- May 9: Best MS student and Summa Cum laude, Karla Rosita Téllez-Girón Flores, see pictures here and here.
- May 8: Thesis Defense, of my UACJ B.S. student Adrián Gaytán Terrazas; see thesis here, and see picture here.
- May 5: Thesis Defense, of my B.S. student Israel Chavarria; see thesis here, and see picture here.
- Mar. 12-15: Visiting AJA International in Scituate MA for training on my new Orion 5 sputtering system. Yes, I was trapped by the snow blizzard that hit Boston on the 14th, see pictures and training videos here.

2016
- Dec. 12-17: Karla Rosita Téllez-Giron Flores, Participant, of Winter School on Nuclear Astrophysics, Shanghai Jiao Tong University, Shanghai, China. See here for more information, Dec. 12 – 17, 2016.
- Oct. 13-16, Israel Chavarria, Travel Award for Conference Experience for Undergraduates in Vancouver, BC CA, sponsored by the Division of Nuclear Physics, APS.
- Oct. 20-23: J.A. López, Chair, of nuclear physics session, 2016 Joint Meeting 4CS + TSAPS Meeting, and Executive Board Meeting of TSAPS, Las Cruces, NM.
- Aug. 16-17: J.A. López, Talk "Materials Characterization at UTEP" at "4° Taller de Espectrometría de Masas con Aceleradores (LEMA)" at the Instituto de Física of the Universidad Nacional Autónoma de México. See pictures of the visit here.
- Summer 2016. Alan Salcedo, COURI Undergraduate Research Program Assistantship.
- June 2: J.A. López, received DOD HBCU Instrumentation grant for $400 k. See notification here.
- Summer 2016, Israel Chavarria, Victor Blanco Fellowship, to participate in Fermilab’s summer research program.
- May 31 - Aug. 5: J.A. López, Visiting Arizona State University with Ricardo Alarcón under a BUILDing Summer Sabbatical Grant.
- April 16-18: J.A. López, Talk, and chair of nuclear physics session, APS April Meeting, Salt Lake City. See abstract and presentation here, and see details of the session chaired here.
• April 7: J.A. López, Talk "The Physics of CSI", Facultad de Fisica, Benemérita Universidad de Puebla, Puebla, México. See "CONSTANCIA" here.
• April 6 - 8: XII International Symposium on Radiation Physics, B UAP, Puebla, México. See web page here.
• Mar. 8: J.A. López, Talk "Fisica en UTEP" at Universidad de Sonora, Hermosillo, Sonora, Mexico.
• Mar. 7: J.A. López, Talk "Fisica del CSI" at Universidad de Sonora, Hermosillo, Sonora, Mexico.
• Feb. 19: J.A. López, Talk "Fisica en UTEP" at CUSEI of the Universidad de Guadalajara.
• Feb. 15: J.A. López, Talk "Fisica nuclear, el Chapo, Osama Bin Laden, y el Papa" at the Tercera Semana de Física y Matemáticas in Universidad de Colima; see news report here.

2015

• Nov. 30 - Dec. 4: J.A. López, Talks "Isospin-dependent phase diagram of nuclear matter" and "Summary Talk", and Chair of sessions "1.2 Monday parallel session 1: Applications: Medical I" and "4.2 Thursday parallel session 1: Hadron structure and interactions II", at the XI Latin American Symposium on Nuclear Physics and Applications, Medellin Colombia; see pictures here.
• Apr. 11-13: J.A. López, Talk at the APS April Meeting in Baltimore, to receive the 2015 Bouchet Award of the American Physical Society. See APS news release "Bridge-builder to Hispanic Community wins Bouchet Award" here, see pictures of the Awards Ceremony and Reception as well as of Baltimore here.

2014

• Oct. 7-11: J.A. López, Talk at the IV Joint Japan-USA Nuclear Physics Conference in Kona, Hawaii to receive the 2014 Mentoring Award of the Division of Nuclear Physics of the American Physical Society; see pictures here.
• Aug. 15 - 18: J.A. López, attending conference 4th International workshop on nuclear dynamics in heavy ion reactions in Lanzhou, China.
• Aug. 10 - 14: J.A. López, attending conference CUSTIPEN at the Peking University in Beijing, China. See program and talks here.
• July 24 - 25: J.A. López, attending conference Nuclear Structure 2014 at the University of British Columbia in Vancouver, BC Canada.
• July 16: J.A. López, "Neutron-Rich nuclear matter" colloquium talk at Nuclear Theory Group of the Lawrence Berkeley National Laboratory, Click here to see abstract.
• June 2 - Aug. 8: J.A. López and Enrique Ramírez-Homs, Visiting the Nuclear Theory Group of the Lawrence Berkeley National Lab in Berkeley, CA.
• Apr. 17: J.A. López, Colloquium talk and Seminar at Oklahoma State University.
• Apr. 2-5: J.A. López, Invited talk at The X International Symposium on Radiation Physics, at the MCTP in Tuxtla Gutiérrez, Chiapas, Mexico.

2013

• Dec. 9-12: J.A. López, Talk in JUSTIPEN-JUSEIPEN Workshop at RIKEN in Tokyo, Japan. JUSTIPEN is The Japan-U.S. Theory Institute for Physics with Exotic Nuclei.
• Oct. 14 - Nov. 7: Teaching MASE 6402 - MME 5401 See material here.
• Jun. 3 - Aug. 9: J.A. López and Enrique Ramirez Homs and Rodolfo Gonzalez, Visiting the Nuclear Theory group of the Nuclear Science Division of The Lawrence Berkeley Lab. See here for note in LBL-NSD newsletter (p.4).
* May 24: J.A. López, Colloquium "Materia nuclear cocinada al estilo italiano", Instituto de Ciencias Nucleares, Auditorio Marcos Moshinsky, UNAM 24/mayo 11:00, Mexico City.
* Jan. 26: High School student Alejandra Robles, member of my XRF group obtains Most Outstanding Award in the El Paso Independent School District Science Fair and she is off to the Regional Science Fair! Congratulations Alex!

2012

* Oct. 22 - Nov. 7: Teaching MASE 6402 - MME 5401 See material here.
* Sep. 28: Visit of Javier Miranda from the Instituto de Física - UNAM to give a Physics Seminar "PIXE and XRF: why does PIXE need XRF?".
* Jun. 4 - Aug. 10: J.A. López and Enrique Ramirez Homs, Visiting the Nuclear Theory group of the Nuclear Science Division of The Lawrence Berkeley Lab.
* May 12-26: J.A. López, Visiting the University of Buenos Aires with Claudio Dorso, delivering a Colloquium Talk: "From nuclei to nuclear pasta" (17/5/2012), and a LAPEC Seminar Talk: "De urnas y vivillos, el fraude electoral en México 2006" (21/5/2012).
* Apr. 9-11: J.A. López, Invited Talk in VIII Symposium on Radiation Physics at IFUNAM, in Mexico City.

2011

* July 10-14: J.A. López, Participant at Meeting of INCREASE, at SLAC in Stanford University and LBNL in Berkeley California, see pictures here.
* May 12: J.A. López, Colloquium Talk, University of California Riverside.

2010

* Nov. 8: J.A. López, Progress report of the XRF study of Pueblo Indian pottery with UTEP Anthropology professor Dr. David Carmichael and MASE-MME students
* Nov. 2: Visit of Dr. Carlos Bertulani and talks at UTEP and NMSU we had Texas BBQ at The State Line and real margaritas at La Posta at La Mesilla.
* Nov. 1: Finished teaching physics part of MASE 6402 - MME 4501 class
* Oct. 11: Start of XRF study of Pueblo Indian pottery with UTEP Anthropology professor Dr. David Carmichael and MASE-MME students
• Sep. 9: **Grant**, UTEP URI grant for Auger/XPS equipment, $5,000. [see announcement here.]

• Aug. 1-13: **J.A. López, Talk** and participation in **PASI 2010 on Rare Isotopes**, Joao Pessoa, Brazil. See **PASI wiki page here**, my personal page here, and the Neutron Stars page here, to see how hard we worked [see the photos here], to see my talk [see the high quality video here], or the low quality video here.

• May 6: Defense of BS thesis of Miguel Bencomo.

• Apr. 29: **J.A. López, Talk** at New Mexico Tech, "The new nuclear physics".

• Apr. 8-10: **J.A. López, Two talks** at U. North Carolina at Wilmington.

• Mar. 7 - 10: **J.A. López, Talk** delivered at the **Symposium of Physics of Radiations** of the Sociedad Mexicana de Física in Zacatecas, Mexico. [See photos here.]

2009

![Texas Section Robert S. Hyer Award](image)

• Oct. 23: **Award:** Received the **Hyer Award** with Jorge Muñoz from the Texas Section of the American Physical Society in San Marcos, TX.

• Oct. 13-17: **J.A. López**, Gave a **Talk** at the **Joint Japan-USA Nuclear Physics Conference** in Kona, Hawaii. [See photos here.]

For a complete list of activities see the web page of Dr. Jorge A. Lopez.

Contact

• Dr. Jorge A. López ([jorgelopez@utep.edu](mailto:jorgelopez@utep.edu))
• Dr. Carlos Díaz Moreno ([carlos.alejandro.diaz.moreno@gmail.com](mailto:carlos.alejandro.diaz.moreno@gmail.com))
• Enrique Ramírez-Homs ([enraho@gmail.com](mailto:enraho@gmail.com))
• Germán Rodríguez ([germanrdz1@gmail.com](mailto:germanrdz1@gmail.com))
• Israel Chavarría ([ichavarria4@miners.utep.edu](mailto:ichavarria4@miners.utep.edu))
• Karla Rosita Tellez-Girón Flores ([ss.rosyx@gmail.com](mailto:ss.rosyx@gmail.com))
• Nazia Sharmin ([nazsharmin@gmail.com](mailto:nazsharmin@gmail.com))
• Omar Hernández Rodríguez ([ohernandez21@miners.utep.edu](mailto:ohernandez21@miners.utep.edu))
• Selim Romero González ([ssromerogon@miners.utep.edu](mailto:ssromerogon@miners.utep.edu))