

SoDoFi

Informativo

**BOLETÍN TRIMESTRAL DE LA
SOCIEDAD DOMINICANA DE FÍSICA**

EDITORIAL

Aún en medio de la pandemia el avance científico y tecnológico no se detiene, muestra de ello es el arribo reciente de *Ingenuity* y el robot explorador *Perseverance* de la NASA al planeta Marte el jueves 18 del mes de febrero del presente año. Esto es constancia de que, a pesar de la adversidad del tiempo presente, se hace necesario seguir explorando nuevos horizontes. Es por tal motivo que países como los Emiratos Árabes Unidos y China también se han lanzado en esta formidable experiencia de explorar en el llamado planeta rojo, todos mostrando un gran despliegue de avance a nivel tecnológico.

En el ámbito nacional, a pesar de las controversias, vemos como se ha iniciado la aplicación de la vacuna contra el virus del COVID-19 en la población, comenzando con el personal de salud. Para luego continuar con una programación que permita la cobertura de una gran parte de la población en lo que resta del presente año, con el fin de lograr la inmunización de la población local ante la pandemia.

Desde SoDoFi también hemos seguido avanzando y muestra de ello fue la celebración de nuestro II Congreso Internacional de la Sociedad Dominicana de Física (II CI-SoDoFi 2021), celebrado exitosamente de manera virtual, lo cual confirma que ciertamente seguimos mostrando y transmitiendo de manera virtual nuestra pasión por la Física.

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II CONGRESO INTERNACIONAL DE FISICA (II CI-SoDoFi 2021)

Modalidad Virtual

Por Comité Organizador

INTRODUCCIÓN

En esta edición estaremos presentando un resumen general de los trabajos presentados durante nuestro II Congreso Internacional de la Sociedad Dominicana de Física (II CI-SoDoFi 2021), el mismo se celebró del 18 al 22 de Enero del presente año 2021, en modalidad virtual. En dicho evento contamos con la participación de 17 países y durante el mismo se presentaron 5 conferencias magistrales, 76 trabajos, 3 conversatorios/networking y un taller interactivo titulado: Diseño de actividades virtuales con simulaciones PhET. Impartido por la Dra. Diana López de la Universidad de Colorado Boulder.

TEMÁTICAS DEL CONGRESO:

Las líneas temáticas del Congreso fueron las siguientes:

- Ciencias de la Tierra
- Física Médica
- Física Educativa
- Física Estadística y Termodinámica
- Astronomía y Astrofísica
- Estado Sólido, Nanociencias y Nanotecnología
- Energía
- Física Matemática
- Partículas y Campos
- Historia y Filosofía de Física

RESÚMENES DE CONFERENCIAS MAGISTRALES

Atomic Scale Imaging and Spectroscopy with Aberration Corrected Transmission Electron Microscopy.

Joachim Mayer, de RWTH Aachen University, Central Facility for Electron Microscopy, Aachen, 52074, Germany.

The invention of aberration correctors has revolutionized the development of TEM and STEM instrumentation. Only shortly after the development and installation of the first TEM with a corrector for the spherical aberration, commercial instruments with aberration correctors have been introduced by all major manufacturers. In order to provide a platform for these novel developments and based on the experience with the first aberration corrected TEM, Research Centre Juelich and RWTH Aachen University have jointly founded the Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons (ER-C). At the Ernst Ruska-Centre we have recently installed the FEI Titan 60-300 PICO. PICO is a fourth-generation transmission electron microscope capable of obtaining high-resolution transmission electron microscopy images approaching 50 pm resolution in the CC- and CS-corrected mode at 300 keV. It is currently one of only three microscopes in the world capable of chromatic aberration correction. In my lecture, I will explain the basics of aberration corrected TEM and will then outline how it has improved the possibilities and accuracies of measurements on the atomic scale. In addition, I will explain how high-resolution TEM experiments can give quantitative insight in further materials properties.

The amazing variety of carbon nanoforms.

Monthieux Marc, Centre d'Elaboration des Matériaux et d'Etudes Structurales, CEMES-CNRS, 29 rue Jeanne Marvig, 31055 Toulouse Cedex 4, France.

Fullerene, nanotube, graphene: everyone nowadays knows about these carbon nanoforms which have attracted the interest of scientists worldwide so much that two Nobel Prizes were dedicated to two of them, in 1996 and 2010. More significant, maybe, they have promoted and boosted the rise of nanomaterials and nanotechnologies, which really started in the 80's, despite physicist Richard Feynman advocated for them as early as in 1959. Since then, carbon nanoforms have been and keep being among the most studied and most promising nanomaterials. This is explained by the unique ability of carbon to exhibit a variety of structures, in association with a variety of hybridisation configurations (sp, sp², sp³), added with its unique ability to exhibit a large variety of textures related to the various types of in-plane and out-of-plane defects which may affect graphene, individually or collectively. Thanks to the combination of both the structural and textural varieties, an incredibly large typology of 1D, 2D, and 3D carbon nanoforms, most often improperly designated as allotropes, are then able to be produced, among which the three cited above are merely the most emblematic ones. The talk aims at introducing the amazing variety of carbon nanoforms, and their related synthesis processes, physical characteristics, availability, and applications (real or expected).



Figura 1. Países participantes en el CI-SoDoFi 2021.

II CONGRESO INTERNACIONAL DE FÍSICA (II CI-SoDoFi 2021)

Modalidad Virtual

Increasing frequency in off-season tropical cyclones and its relation to climate variability and change. A cargo de: **José J. Hernández Ayala¹ and Rafael Méndez Tejeda²**

¹Climate Research Center, Department of Geography, Environment and Planning, Sonoma State University, 3016 Stevenson Hall, 1801 East Cotati Ave., Rohnert Park, CA 94928, USA. ²Research Laboratory in Atmospheric Science, University of Puerto Rico at Carolina, Puerto Rico. P. O. Box 4800, 00984, Carolina, Puerto Rico.

This article analyzes the relationship between off-season tropical cyclone (TC) frequency and climate variability and change for the Pacific Ocean and Atlantic Ocean basins. TC track data were used to extract the off-season storms for the 1900–2019 period. TC counts were aggregated by decade, and the number of storms for the first 6 decades (pre-satellite era) was adjusted. Mann-Kendall nonparametric tests were used to identify trends in decadal TC counts and multiple linear regression (MLR) models were used to test if climatic variability or climate change factors explained the trends in off-season storms. MLR stepwise procedures were implemented to identify the climate variability and change factors that explained most of the variability in off-season TC frequency. A total of 713 TCs were identified as occurring earlier or later than their peak seasons, most during the month of May and in the West Pacific and South Pacific basins. The East Pacific (EP), North Atlantic (NA) and West Pacific (WP) basins exhibit significant increasing trends in decadal off-season TC frequency. MLR results show that trends in sea surface temperature, global mean surface temperature and cloud cover explain most of the increasing trend in decadal off-season TC counts in the EP, NA and WP basins. Stepwise MLR results also identified climate change variables as the dominant forces behind increasing trends in off-season TC decadal counts, yet they also showed that climate variability factors like El Niño–Southern Oscillation, the Atlantic Multidecadal Oscillation and the Interdecadal Pacific Oscillation also account for a portion of the variability.

PhET Interactive Simulations: Engaging students and supporting learning in physics.

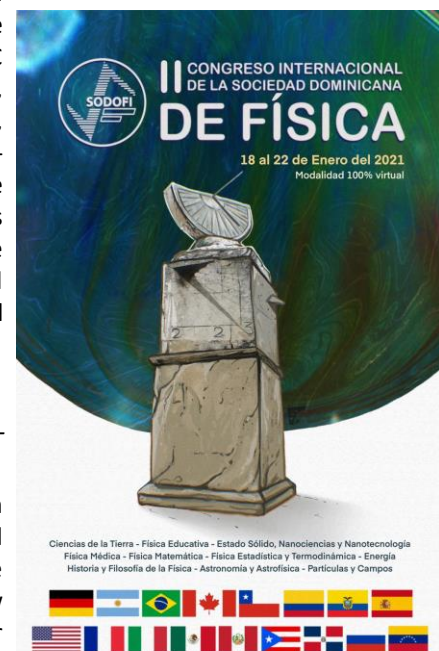
A cargo de: **Katherine Perkins** University of Colorado Boulder, Department of Physics and PhET Interactive Simulations, Boulder, Colorado, USA, 80309

As physics educators, we are faced with the challenge of addressing multiple educational goals in our courses – from achieving specific content learning, to developing disciplinary practices and habits of mind, to growing student’s appreciation and engagement in STEM. In 2020, the challenge has further increased with the shift to remote learning due to COVID-19. In this talk, I examine how education technology (specifically interactive simulations) can be designed and integrated into our instructional practice to open up new opportunities to support these diverse goals, whether in the classroom or online. Over the past 15 years, the PhET Interactive Simulations project at the University of Colorado Boulder has developed over 150 interactive simulations for teaching and learning physics and other STEM topics (<https://phet.colorado.edu>). All of the simulations are freely available, licensed as open educational resources (OER), and translated into Spanish. Each simulation is based on education research, and provides a highly interactive environment which supports exploration, makes the invisible visible, includes the visual models that experts use, and emphasizes the connections between real life phenomena and the underlying science. Today, these simulations are available in 94 languages and used 200 million times per year. Examples will highlight a variety of instructional uses that create productive learning opportunities for students whether in lecture, lab, and homework and through the extra challenges imposed by COVID-19.

Thermal engineering and modern IT.

A cargo de: **Valery Ochkov**, Moscow Power Engineering Institute (Technical University) Krasnokazarmennaya St., 14, Moscow, 111250, Russia

The report will talk about modern means of Internet support for engineering bureaus working in the field of design, construction, adjustment and operation of energy facilities and about the physical and mathematical support of this area of activity.



REFERENCIA BIBLIOGRÁFICA

[1] II Congreso Internacional de la Sociedad Dominicana de Física, LIBRO DE RESÚMENES, R.D., 2021. ISSN 2679-0606

ACTIVIDADES DEL TRIMESTRE

Sábado 12 de diciembre del 2020

Se celebró la reunión de fin de año de SoDoFi de manera virtual, **“Toque de queda con SoDoFi”**, donde los miembros compartieron un tiempo agradable al sonar del violín, además de Karaoke y otras actividades de entretenimiento.

Miércoles 10 de febrero 2021

6:00 pm a 7:00 pm

Conversatorio virtual titulado: *Experiencias en las clases de Física en la virtualidad “Organización del Curso”*.

A cargo de: Emma K. Encarnación
Miembro pleno de SoDoFi

Miércoles 24 de febrero 2021

7:00 pm a 9:00 pm

Conferencia virtual titulada: *Mario Bunge, vida, obra y su filosofía de la ciencia: de las ciencias básicas a las sociales.*

A cargo de: Moisés Álvarez
Coordinador de la Comisión de Ciencias Básicas y Tecnología de la Academia de Ciencias de la República Dominicana y Profesor de Física en la UNPHU

Conversatorio virtual titulado: *Experiencias en las clases de Física en la virtualidad “Ejecución en los laboratorios”*.

A cargo de: Anny Lorenzo
Maestra de la Escuela de Física de la UASD

¡Sigue transmitiendo tu pasión por la Física!



“Toque de queda con SoDoFi”



“Organización del curso”



“Conferencia sobre Mario Bunge”



“Ejecución en los laboratorios”