

XXXII Annual Meeting of the Division of Particles and Fields



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UNIVERSIDAD TECNOLÓGICA METROPOLITANA

28-30 May 2018, Instituto de Ciencias Nucleares, UNAM

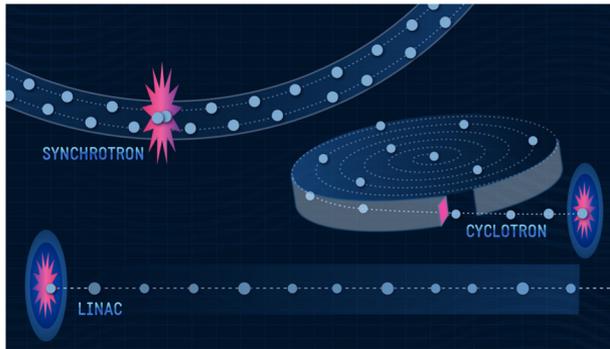
- CIIDTAP -

Interinstitutional Collaboration for Research and Development of Particle Accelerator Technology in México

Karla Cantún, Carlos Basilio, Daniel
Chávez, Humberto Maury, María García,
Max Ríos y Víctor Cruz

History

In Mexico, there were several attempts to develop accelerator science and technology as a natural response to wide participation of mexican scientist in HEP area.



- **2006:** CONACyT offered an opportunity to work on mega-projects: synchrotron radiation light source.
- **2009:** HEP Network (Red FAE) concluded as an important action the development of human resources oriented to different disciplines related to accelerators.
- **2010:** A human resources training program in accelerator physics began; students were sent to different labs.
- **2015:** Mexican Particle Accelerator Community (CMAP) was conformed by scientists and students from different universities and institutions.
- **2018:** **CIIDTAP was created!!!**

Colaboración Inter-Institucional para el Desarrollo de Tecnología de Aceleradores de Partículas (CIIDTAP)

It is an inter-institutional and multidisciplinary collaboration encompassing five Mexican institutions, focused on the development of Mexican accelerator technology.



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CIIDTAP



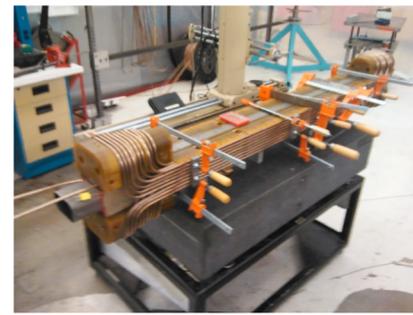
This collaboration aims at sharing resources and know-how among the participating institutions, with the goal of carrying out technological developments that would be hardly feasible for a single institution, or within a single discipline.

CIIDTAP Members

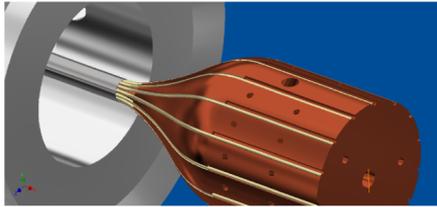


Skills

Superconducting /normal conducting magnet design
Accelerator technology design and development
Applied Superconductivity
NbTi, MgB₂, Bi2212, Nb₃Sn superconductors
HP VEE programming
Linux CNC programming
Engineering design
Finite Element Analysis modeling
Comsol Multiphysics: Thermal, Mechanical, AC&DC models
QC characterization
Gamma Ray Spectroscopy for environmental radiation detection
E&M analysis for accelerator technology
Thermal analysis for accelerator magnets
Mechanical and structural analysis
3D printing R&D
High temperature heat treatment on exotic materials



M.Sc. Daniel Chavez V.
Ph.D. Candidate
Universidad de Guanajuato /
Texas A&M University
Accelerator Physicist

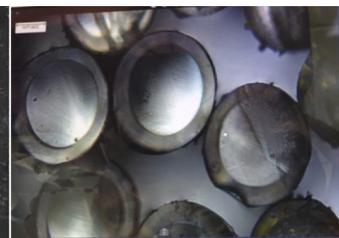
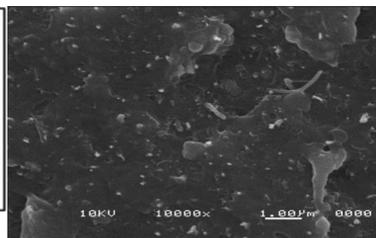
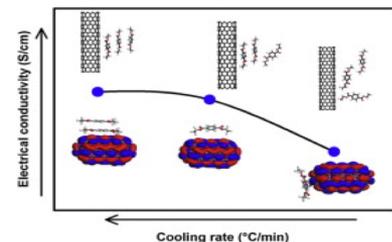


dchavez@fisica.ugto.mx | [LinkedIn.com/in/dchavezmagnetlab](https://www.linkedin.com/in/dchavezmagnetlab) | +1 (832) 858 8616
1301 Barthelow Dr. Apt. 31B. College Station, Tx. 77840, USA.



Dr. Víctor J. Cruz-Delgado, received his Doctorate degree in Polymer Technology from the Research Center for Applied Chemistry (CIQA), Saltillo, Mexico in 2009. He was joined to CIQA as Associated Research Fellow from 2013 to 2017, and since October 2017 as Cathedra Research Fellow of CONACYTt in the Materials Department at the Scientific Research Center of Yucatan (CICY). He has co-authored more than 13 articles and 7 inventions, 1 patent granted in 3 countries. His current research areas include; recycling and processing of polymer nanocomposites with different additives for several applications including medical, textile, automotive, building, packaging and renewable energy.

<http://www.cicy.mx/unidad-de-materiales/investigador/victor-javier-cruz-delgado>



Electrical properties of carbon nanoparticles dispersed in a polymer and image of them

Core-Shell synthetic fibers and equipment to obtain them

Extruder for preparation of polymer nanocomposites



Dr. María Concepción García Castañeda

Catedrático CONACyT– Universidad de Guanajuato



- ❖ Bachelor degree in Chemistry: Universidad Autónoma de Coahuila (UAdeC)
- ❖ Ph.D. in Technology of Polymers: Centro de Investigación en Química Aplicada (CIQA)
- ❖ Posdoctoral fellowship: Universidad Autónoma de San Luis Potosí (UASLP)

Research areas:

- ❖ Thermoplastic transformation processes.
- ❖ Polymer modification using plasma and ionized radiation
- ❖ Synthesis and superficial modifications of nanomaterials
- ❖ Nanocomposites preparation in polymerical matrix
- ❖ Development and application of essentially new advanced nanostructured materials obtained from natural extracts or using environmentally friendly methods for industrial interest and/or biomedicine applications



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M. Sc. José Carlos Basilio Ortiz

Ph. D. student at Centro de Investigación y de Estudios Avanzados del IPN

Skills: Development of light-emitting diodes based on II-VI nanoparticles of semiconductor materials.

Optical properties of semiconductor materials.

Modeling of semiconductor nanoparticles.

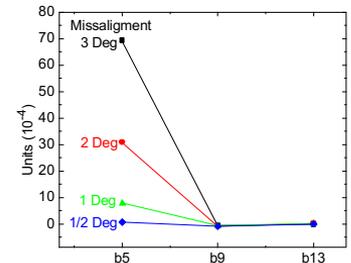
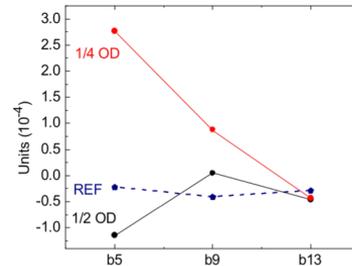
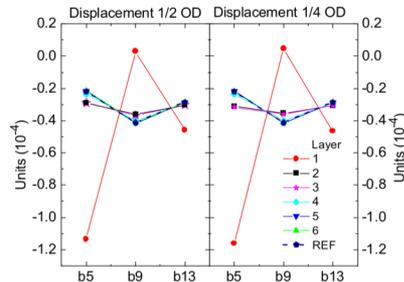
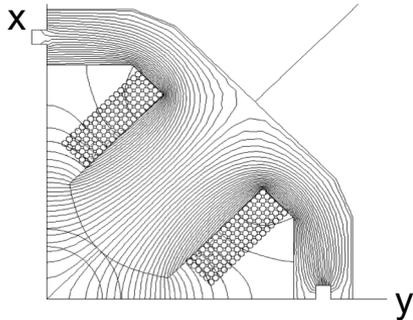
DNYN Program, Cinvestav, Ave. IPN 2508, 07360 Mexico City, Mexico



jose.basilio@cinvestav.mx

Field Quality Analysis of a mockup-winding of a 5 T/m Normal Conducting Quadrupole

J. Carlos Basilio, Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, Av. IPN, San Pedro Zacatenco, 07360, Ciudad de México.
K. Cantón, Facultad de Ingeniería, Universidad Autónoma de Yucatán, Av. Industrias no Contaminantes por Periférico Norte, Apdo. Postal 150 Cordemex, Mérida, Yucatán.
D. Chávez Valenzuela, M.C. García-Castaneda, G. H. I. Maury Cuna, M. Napsuciale, Universidad de Guanajuato, León, México.
V.J. Cruz-Delgado, CONACYT-Centro de Investigación Científica de Yucatán, Unidad de Materiales, Calle 43 No. 130, Chuburna de Hidalgo, 97205, Mérida, Yucatán.
M. Ríos, Universidad Tecnológica Metropolitana, Calle 115 No. 404 por calle 50, Santa Rosa, 97279, Mérida, Yucatán.





Name: **Humberto Maury Cuna**

Degree: **Doctor**

Affiliations: **University of Guanajuato/CERN**



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israel.maury@ugto.mx

Working topic:

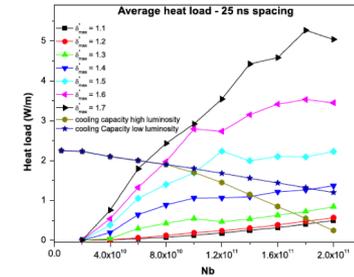
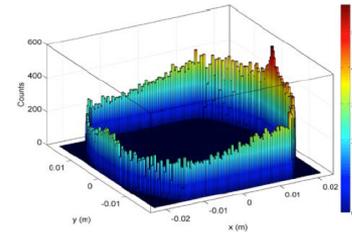
Electron cloud effects in the LHC and FCC:

An electron cloud is an important issue for the LHC performance and beam quality. I am working on studies to mitigate this effect. In addition, how EC will affect the future accelerators like FCC is being investigated.

Mapping of the beam-induced synchrotron radiation at the LHC:

The EM radiation due to the beam in the LHC is a key ingredient to electron cloud build-up codes. Employing codes as SYNRAD3D can help to map the distribution of the SR photons along the LHC.

Particle Accelerator Group at UG: Currently, I am coordinating the particle accelerator group at Universidad de Guanajuato. The group is formed by 2 mechatronics engineers, 1 Electromechanic engineer and two undergrad physics students.

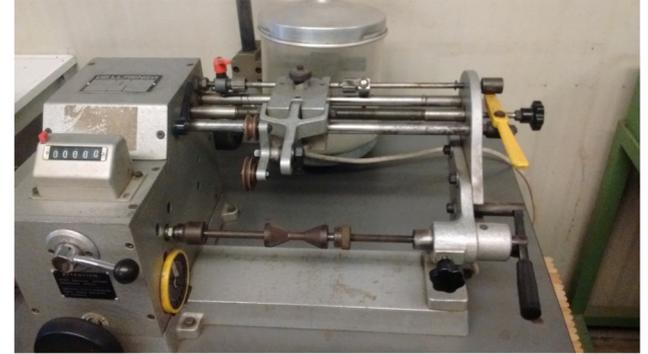


Areas of interest: **collective effects, synchrotron radiation, cyclotrons, accelerators for industrial applications.**



Max Ríos Gutierrez

Degree:
M.Sc. Mechatronic
Mechanical engineer



Working Topic:
Design of Mechanical systems.
Making of Prototypes
Automatic control



Universidad Tecnológica Metropolitana
Calle 115 No. 404 por Calle 50, Santa Rosa, 97279 Mérida, Yuc. Teléfono: 01
999 940 6100

Received Doctorate degree in CINVESTAV-Unidad Mérida on 2013
H1Collaboration member since 2006



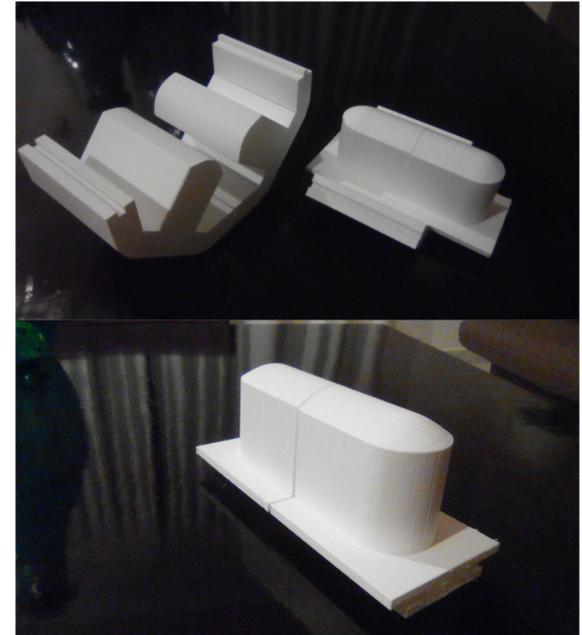
karla.cantun@correo.uady.mx

Research Areas

Experimental High-Energy Physics, Strange Particle
Production
Boson W coupling for leptons

Skills

C++ programming, OOP in C++
Particle simulation with CalcHEP
Data Analysis using Root Framework



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INGENIERÍA

Campus de Ciencias Exactas e Ingenierías
Av. Industrias No Contaminantes por Anillo
Periférico Norte S/N., C.P. 97302
Apartado Postal núm. 150 Cordemex.
Teléfono: (999) 930 05 50, ext. 1053
Mérida, Yucatán, México

CIIDTAP R&D Projects



Working task assignment:



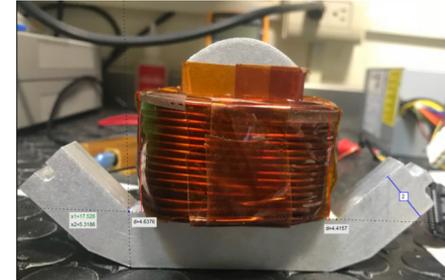
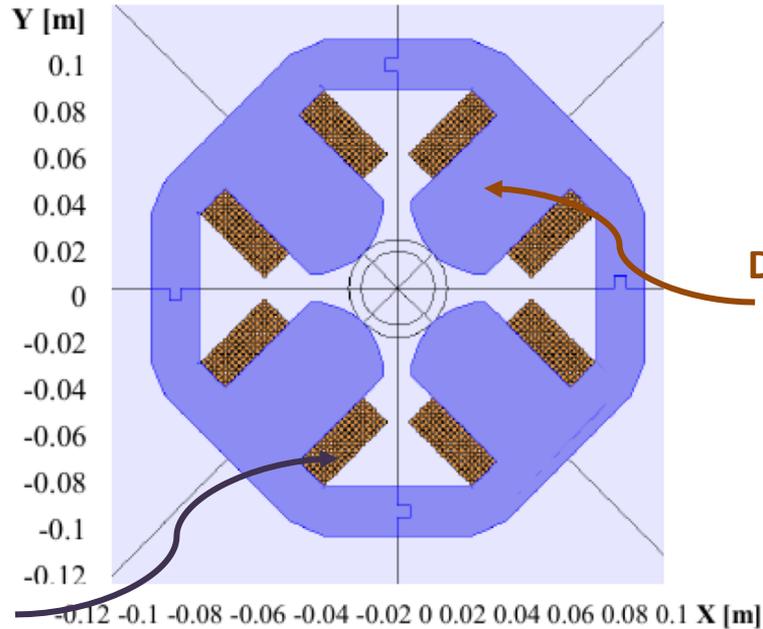
**Quadrupole
design, study
and simulation**



**Design and
construction of
mechanical tools**



**Design and characterization
of new magnetic materials**



**Thanks to Dr. C. Valerio
(UAS)**

CIIDTAP R&D Future Projects:

Year 1

Normal conducting quadrupoles →

- Development of first full-scale prototype
- Characterization of field quality
- Experimental field measurement

Year 3

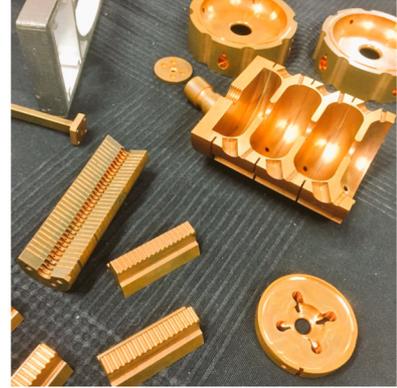
Normal conducting dipoles →

- Design of a low-field normal conducting dipole magnet
- Development of tooling
- Winding and quality control
- Experimental field measurement

Year 5

Normal conducting RF cavity →

- Analytic, mechanic and magnetic design of a normal-conducting RF cavity



List of Publications:

- Chavez, D., et al. "Status Report on the R&D of a 5 T/m Normal Conducting Quadrupole Magnet for the 10-MeV Beam Line of the Electron Linac of the Mexican Particle Accelerator Community." *Journal of Physics: Conference Series*. Vol. 912. No. 1. IOP Publishing, 2017.
- Lizarraga, Cristhian Alfonso Valerio.,et al."Study of the first Mexican RF linear accelerator." *Revista Mexicana de Física* 64.2 (2018): 116-121.
- Chavez, D., et al. "Field and Cost Optimization of a 5 T/m Normal Conducting Quadrupole For the 10-MeV Beam Line of the eLINAC of the Mexican Particle Accelerator Community", International Particle Accelerator Conference, Vancouver, Canada (2018) 10.13140/RG 2.2.25872. 30720. <http://ipac2018.vrws.de/papers/thpml102.pdf>

The background features abstract, overlapping green geometric shapes in various shades, ranging from light lime green to dark forest green, creating a modern, layered effect on the right side of the slide.

Thank you !!!

israel.maury@ugto.mx