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Accelerator Physics at UADY

Dra. Karla Cantún

Mexican Involvement in FCC Accelerator R&D
Coloquio Virtual de la Comunidad Mexicana de Aceleradores

June 21, 2021

UADY - UGTO Collaboration

Our team is a recent collaboration formed by:

- Karla Cantún , Enrique Camacho

(UADY Professors)

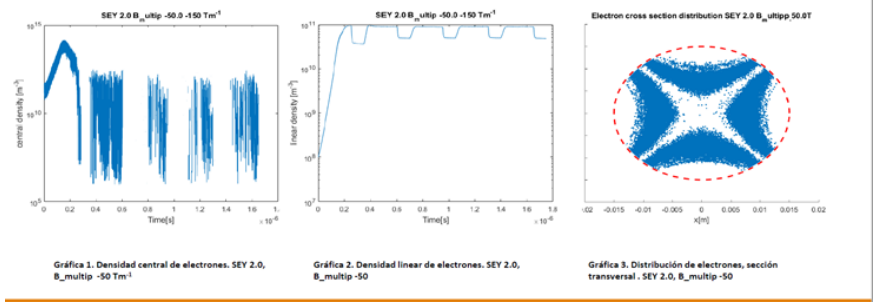
- Humberto Maury (UGTO Professor)
- Alejandro Díaz (Former student)
- Damián Ayim (Current student).

The UADY Group became an official contributor to the FCC Study since march 2021

FUTURE CIRCULAR COLLIDER

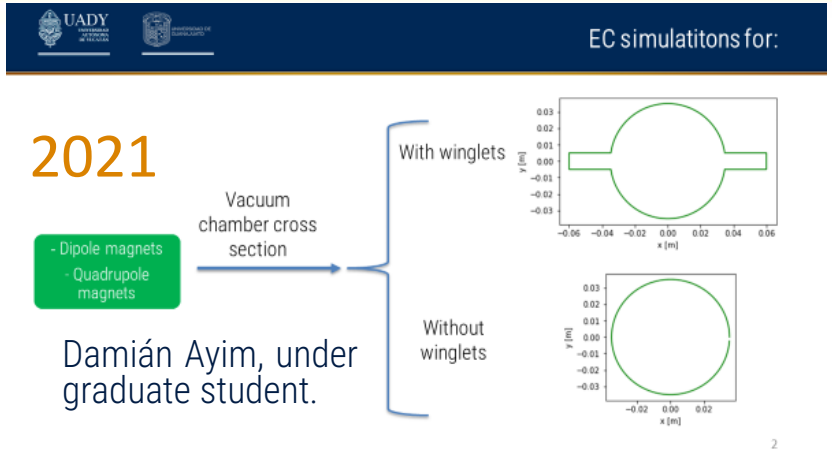
Electron-cloud buildup studies for FCC-ee UADY – UG Collaboration

2018 Simulation for quadrupolar gradients
Electron distribution in cross section

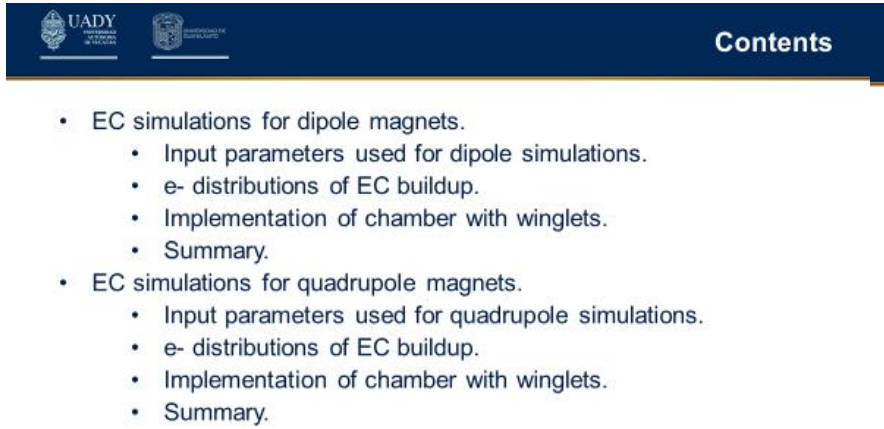


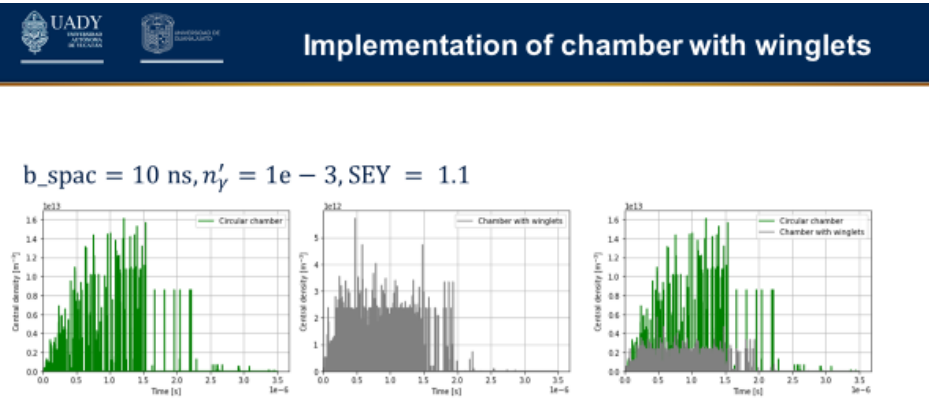
Electron cloud study at quadrupolar sections for Future Circular Collider for positrone ring using PyECLOUD

- Alejandro Díaz Serrano 2018, physics engineer student.



- Simulations of EC build-up for dipole and quadrupole magnets of the CERN FCCe+e-





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Thank you!

R&D Developed at UAS

C. Valerio

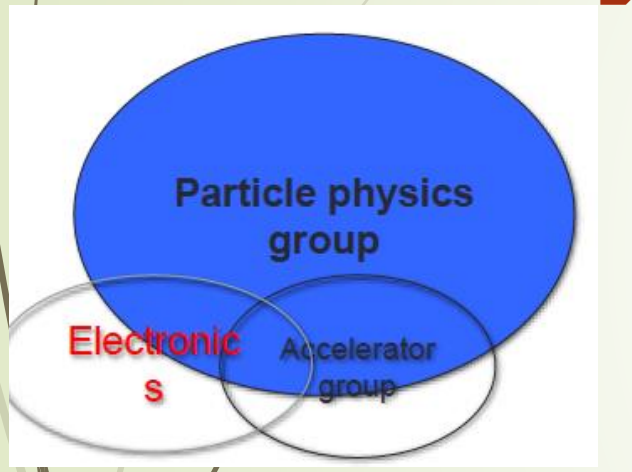
Facultad de ciencias fisico matematicas.

Universidad Autonoma de Sinaloa.

Universidad Autonoma de Sinaloa

Facultad de ciencias Físico matemáticas

- Universidad Autonoma de Sinaloa (UAS)

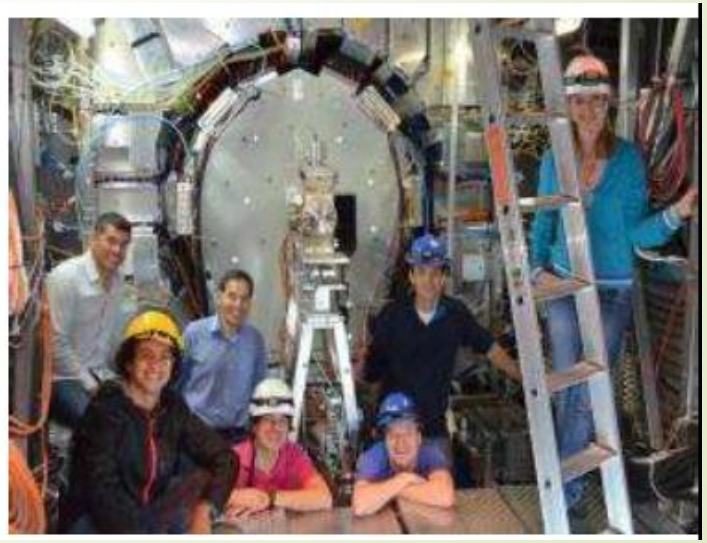


Development of radiation detectors for several laboratories
- Alice project CERN
- BELLE II –KEK JAPAN

The detectors group it has active collaboration With several universities in Mexico and international institutes

Five years ago, a new group dedicated to accelerator physics has been created

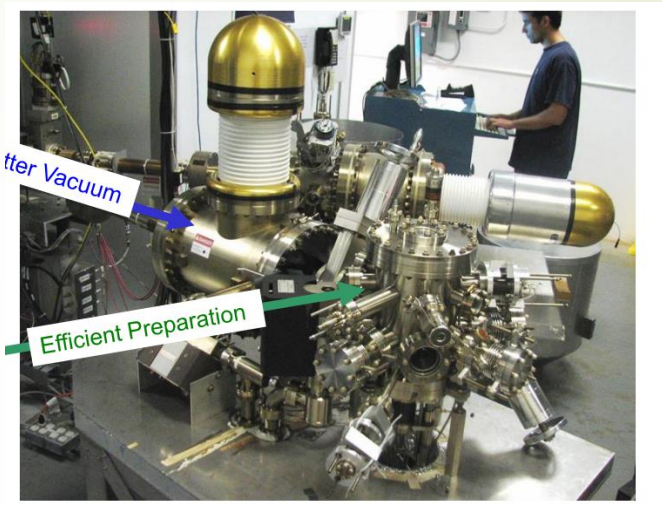
- Particle Sources
- system design
- Beam Simulation
- Outgoing collaborations with different institutes



Particle Sources

- We develop research on particle sources.
- Specially the interaction between the beam and the residual gas.
- In electron guns there is an outgoing collaboration with Jefferson Lab in the CEBAF photocathode Gun.
- In ion sources a collaboration with CERN has been stablish where CERN has donated a copy of the ion source to UAS.
- Memorandum of Understanding for the Future Circular Collider (FCC) has been signed by the University Rector.

CEBAF Electron Gun

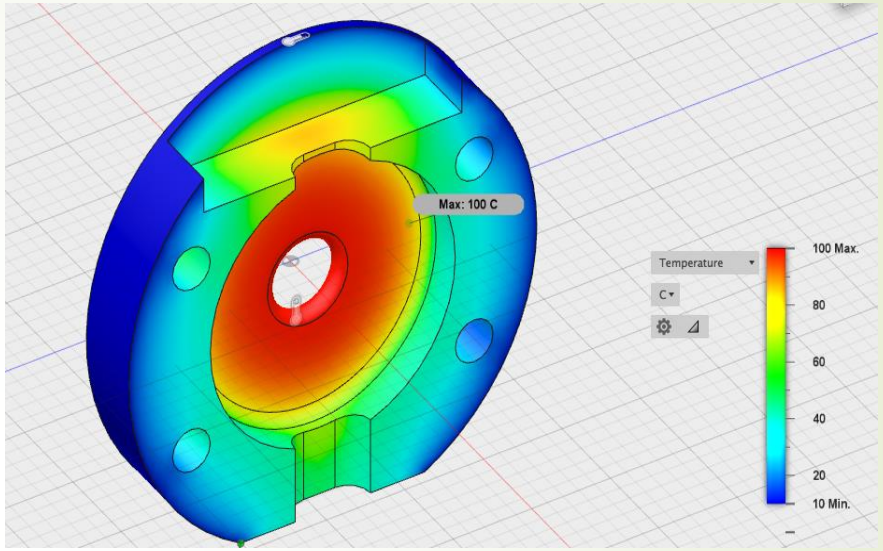


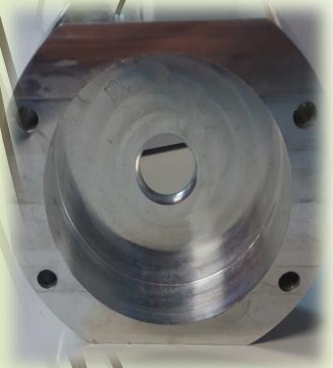
Linac4 Ion Source

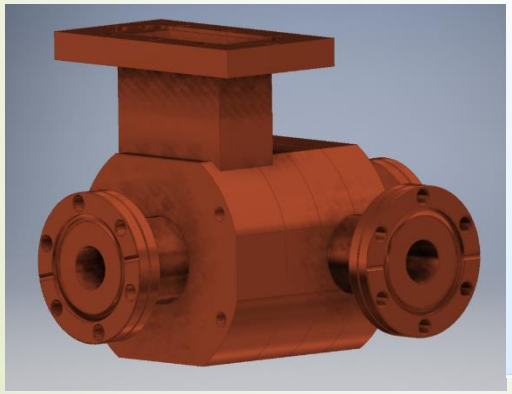
Radiofrecuency cavity design

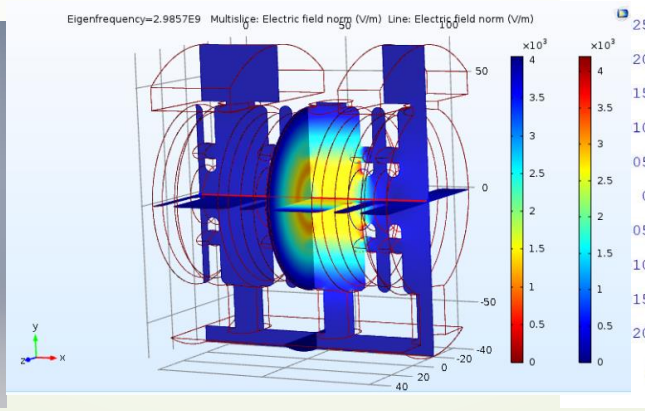
Error porcentual en comparación con la medición

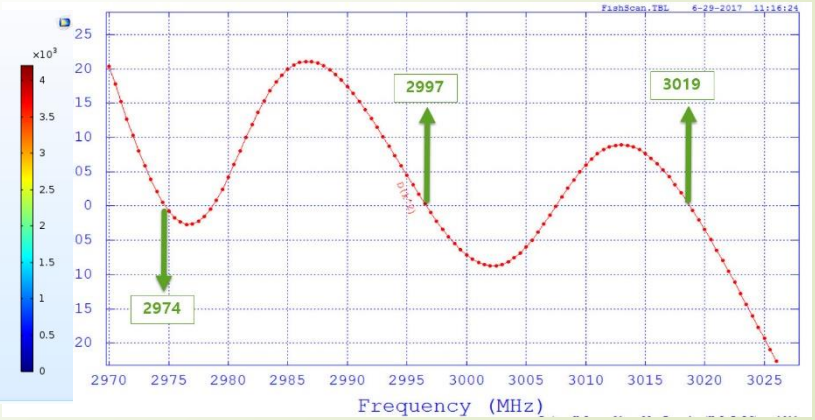
	MODO 0	MODO $\frac{\pi}{2}$	MODO π
MEDICIÓN (MHz)	2975	3007.14	3040.48
SIMULACIÓN PS(MHz)	2977	3002	3023
SIMULACIÓN CST	2977.231	3001.594	3022.719
SIMULACIÓN COMSOL	2971.2	2990.7	3014.15
Error PS (%)	0.067	0.17	0.574
Error CST (%)	0.074	0.184	0.584
Error COMSOL (%)	0.127	0.546	0.865











- GRACIAS!!

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Accelerator physics at UGTO

Dr. Georfrey Humberto Israel Maury Cuna

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Coloquio Virtual de la Comunidad Mexicana de Aceleradores

June 21, 2021

Accelerator Physics at Science and Engineering Division

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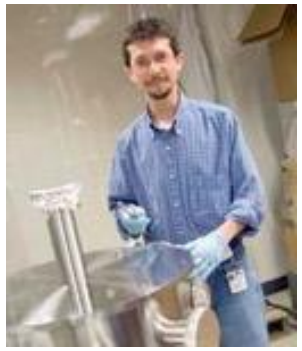
Full-time professors:

-Dr. Mauro Napsuciale Mendivil
-Dr. Humberto Maury Cuna
-Dr. Daniel Chávez Valenzuela
-Dr. María García Castañeda

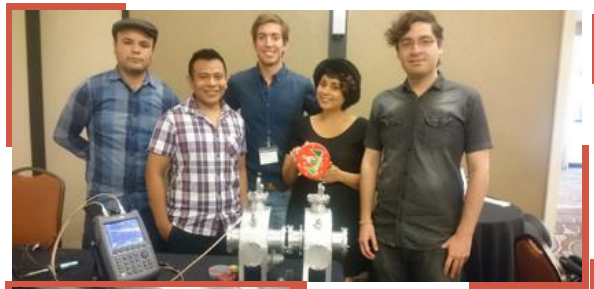
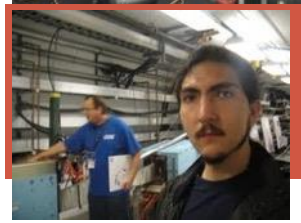



Professor collaborator:

Dr. Carlos Hernández-García (JLAB)



Students	
Ph.D	3
Master	2
Bachelor degree	1


Former and actual members

- Hosting the Mexican Particle Accelerator School (MePAS) since 2011.

Project in colaboration with Lancaster University

Reducing **E**nvironmental impact of the **L**eather-tanning **I**ndustry with **E**lectron beam **F**acilities

Flagship Project: 5 MeV eLINAC

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Pheripheral equipment

- RF equipment
- Basic vacuum system
- High-performance computing equipment

Currently in stand-by due to budget cuts

High voltage power source 80 kV

Particle sources (egun of 80 keV)

Test laboratory

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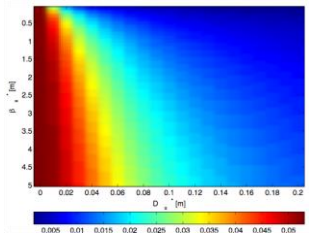
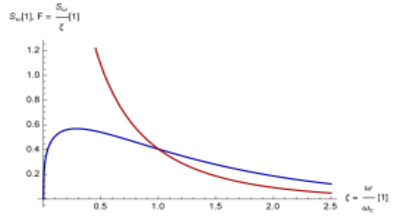
- UGTO became an official contributor to the FCC study since august 2015.
- EC studies in collaboration with the UADY group.
- Design and optimization of the interaction region of the FCC-ee *(Master's Thesis)*
- Monochromatization scheme in FCCe-e+ collider

Objectives
•Characterize the radiation effects at the FCCe+e-
•Quantify the IP parameters modification due to the radiation effects.
•Define the IP parameters to produce monochromatization
•Develop an optimized monochromatization scheme for the FCCe+e-





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Thank you