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UNIVERSIDAD
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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



Our team is a recent collaboration formed by:

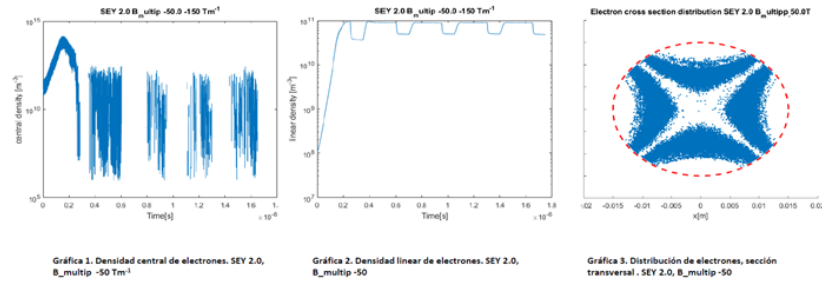
- ❖ **Karla Cantún , Enrique Camacho** (UADY Professors)
- ❖ **Humberto Maury** (UGTO Professor)
- ❖ **Alejandro Díaz** (Former student)
- ❖ **Damián Ayim** (Current student).



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

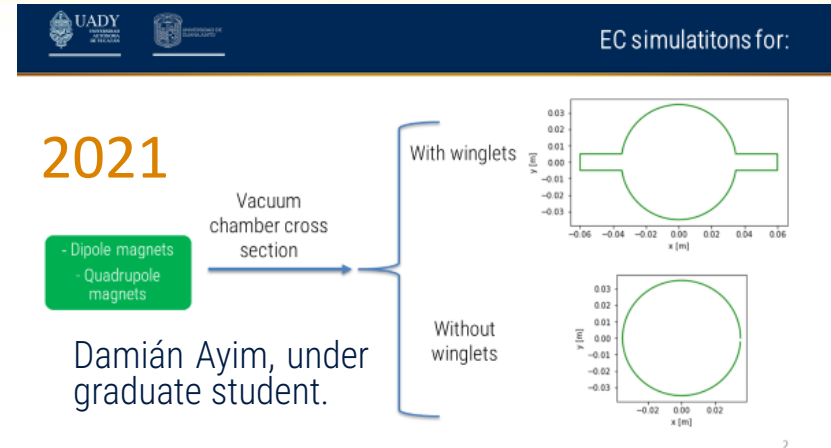


2018 Simulation for quadrupolar gradients Electron distribution in cross section



Electron cloud study at quadrupolar sections for Future Circular Collider for positron ring using PyECLoud

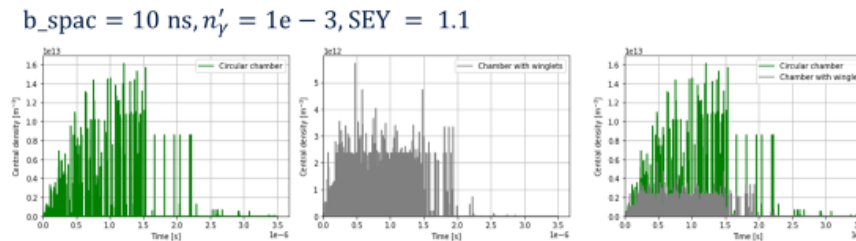
- Alejandro Díaz Serrano 2018, physics engineer student.



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

Contents Implementation of chamber with winglets

- EC simulations for dipole magnets.
 - Input parameters used for dipole simulations.
 - e- distributions of EC buildup.
 - Implementation of chamber with winglets.
 - Summary.
- EC simulations for quadrupole magnets.
 - Input parameters used for quadrupole simulations.
 - e- distributions of EC buildup.
 - Implementation of chamber with winglets.
 - Summary.





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Thank you!



R&D Developed at UAS

C. Valerio

Facultad de ciencias fisico matematicas.

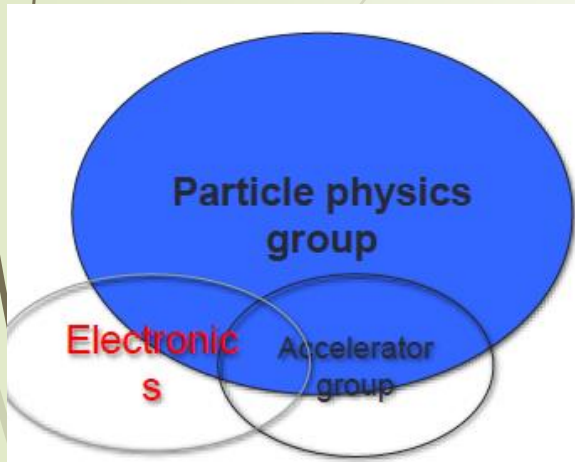
Universidad Autonoma de Sinaloa.

Universidad Autonoma de Sinaloa

Facultad de ciencias Físico matemáticas

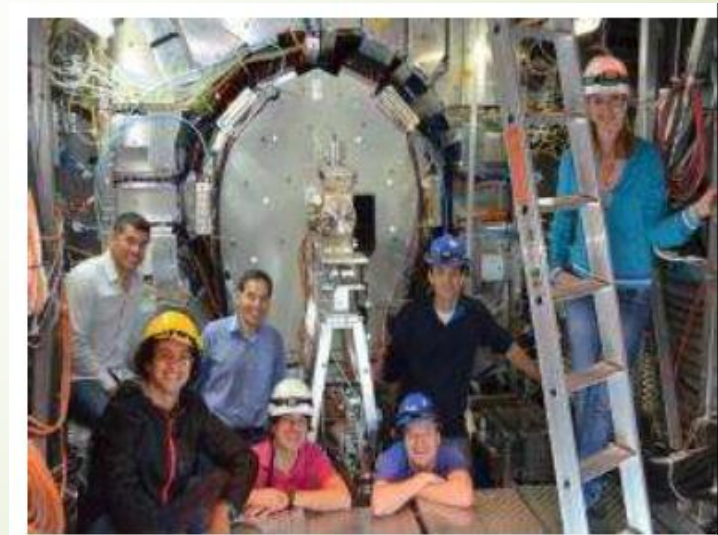
- Universidad Autonoma de Sinaloa (UAS)
Development of radiation detectors for several laboratories
 - Alice project CERN
 - BELLE II –KEK JAPAN

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

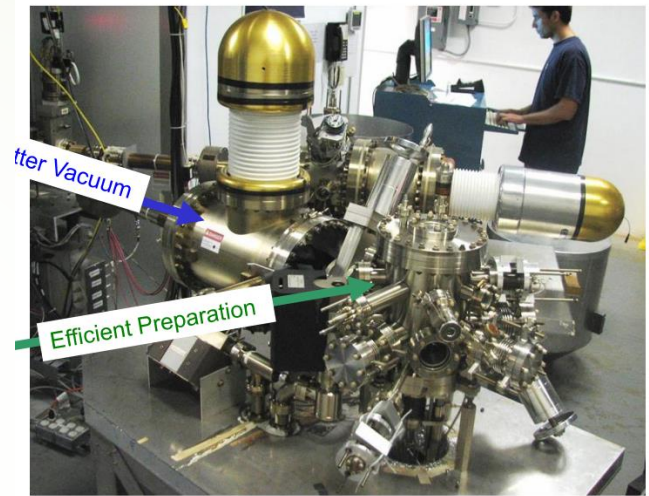
- Particle Sources
- system design
- Beam Simulation
- Outgoing collaborations with different institutes



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 establish 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



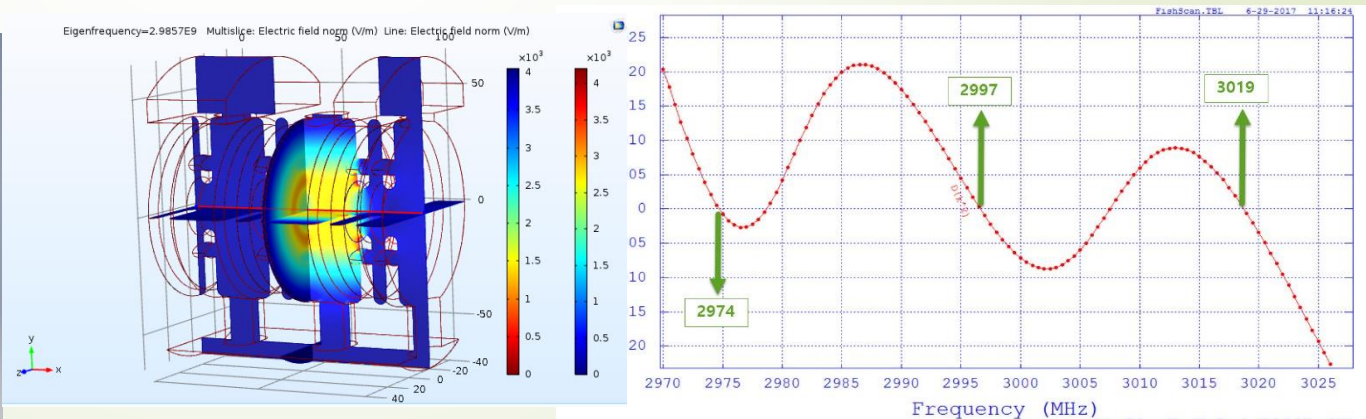
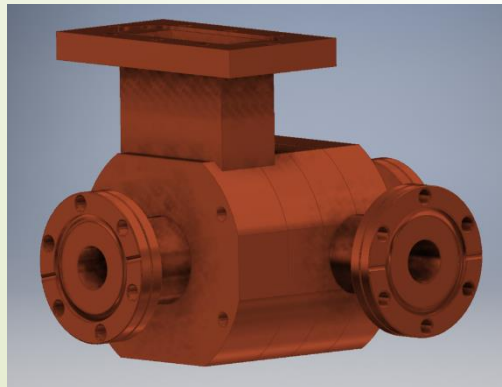
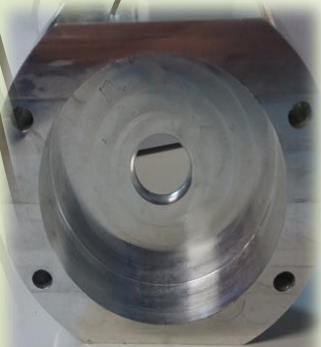
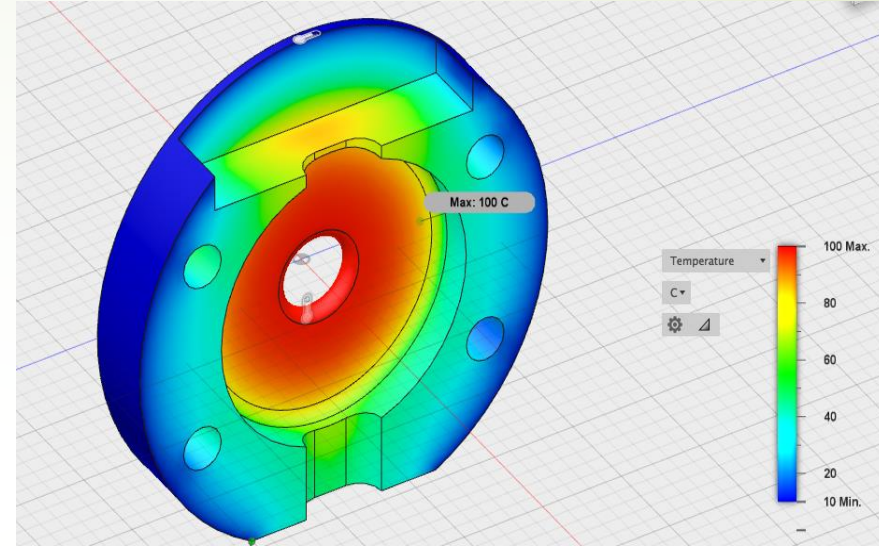
Linac4 Ion Source



Radiofrequency 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!!**