

# Diseño, construcción y calibración del telescopio de muones, MuTe 2.0

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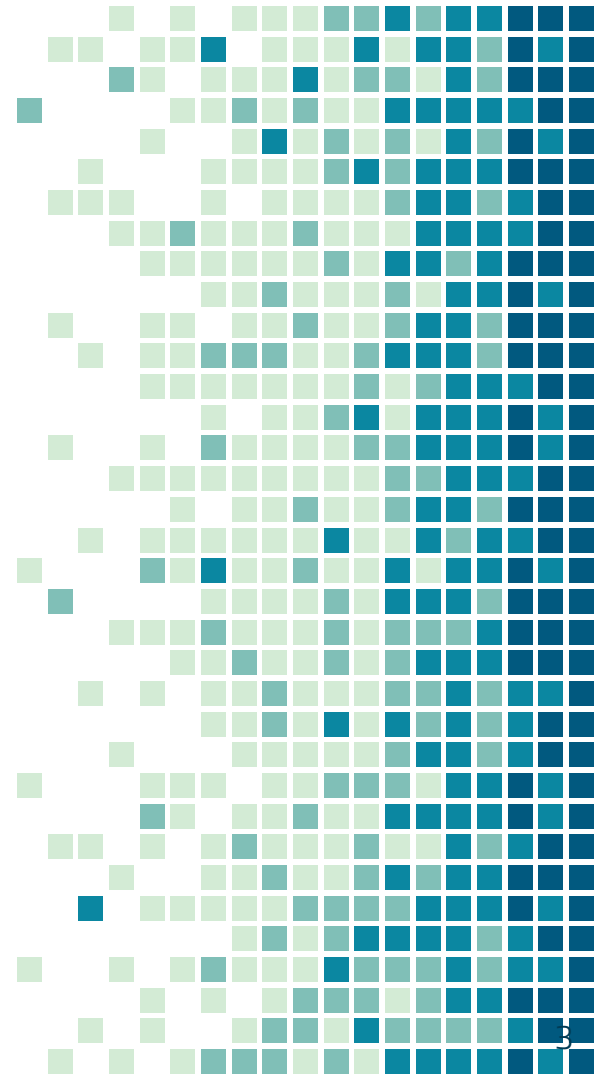
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- Muografía
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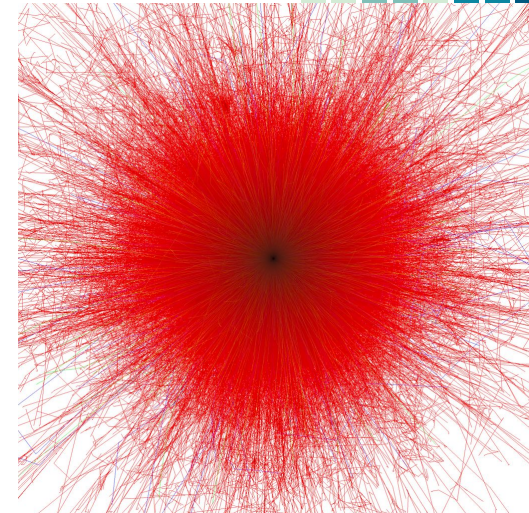
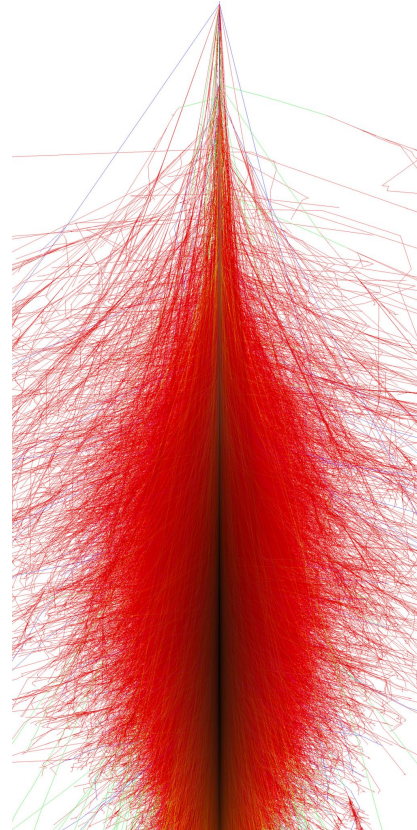
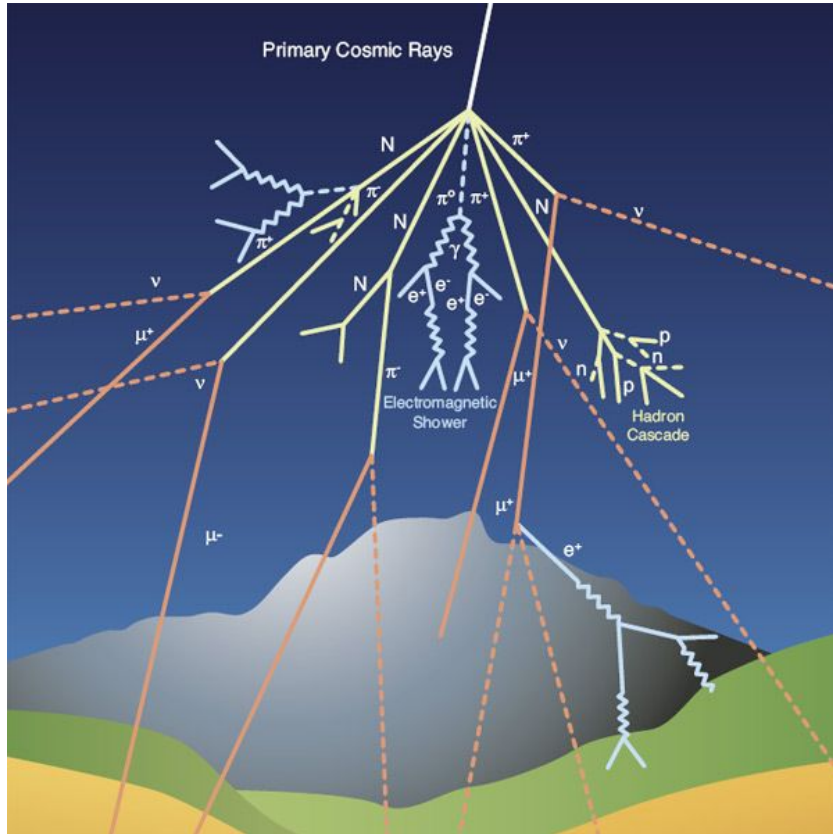


1.

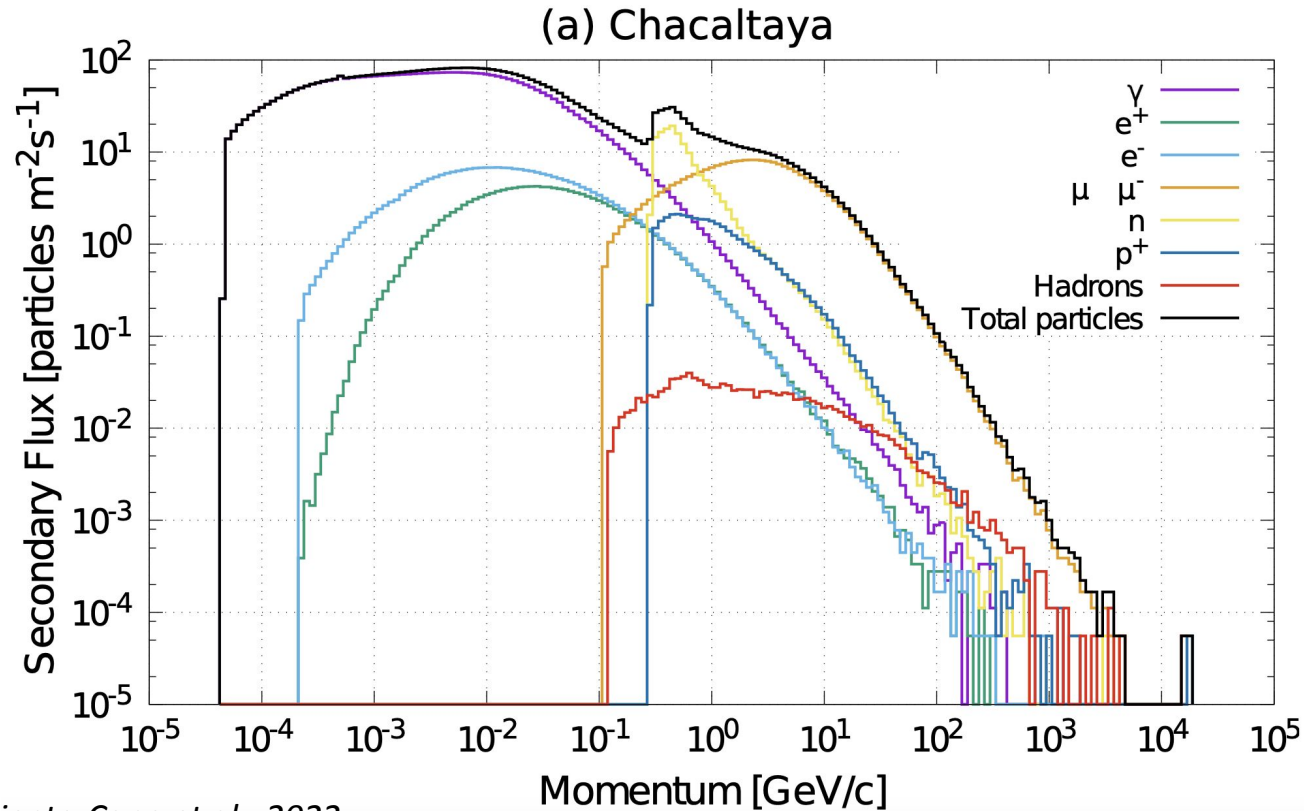
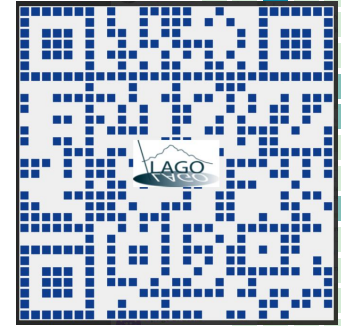
# Muografía



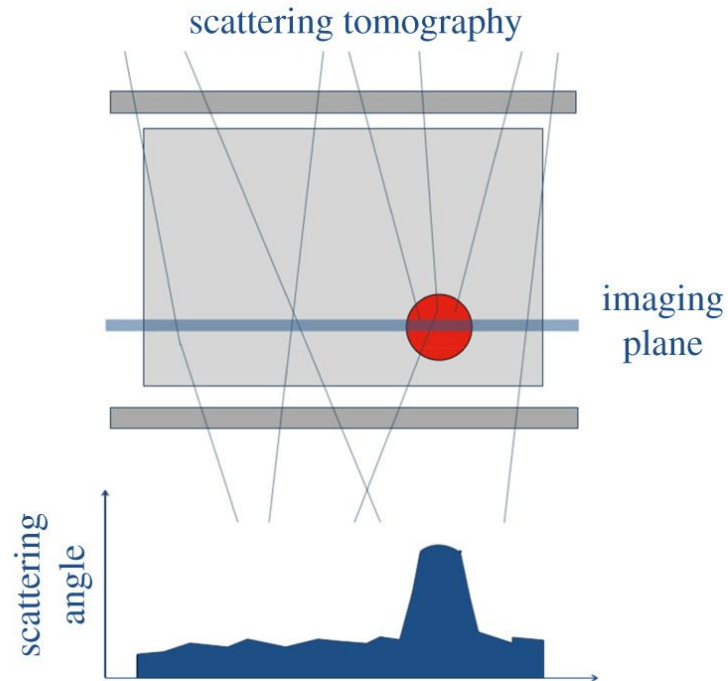
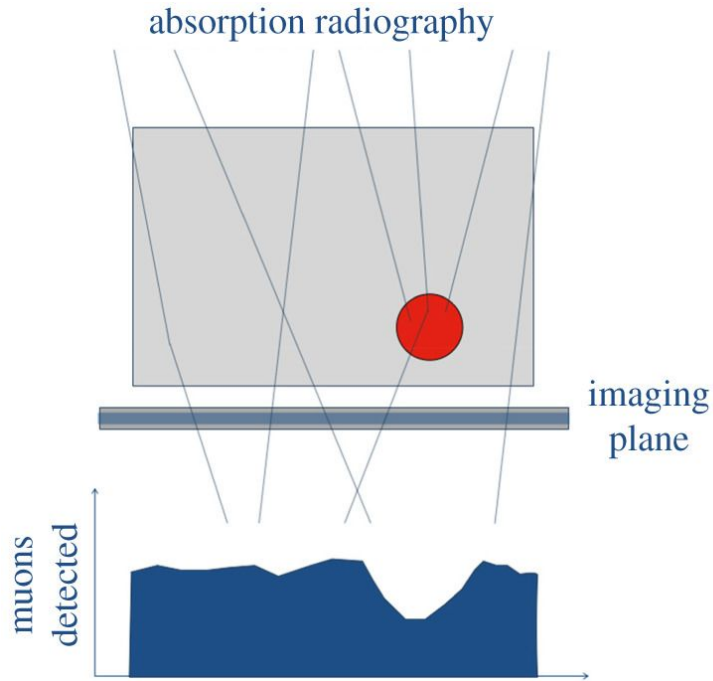
# Flujo de rayos cósmicos



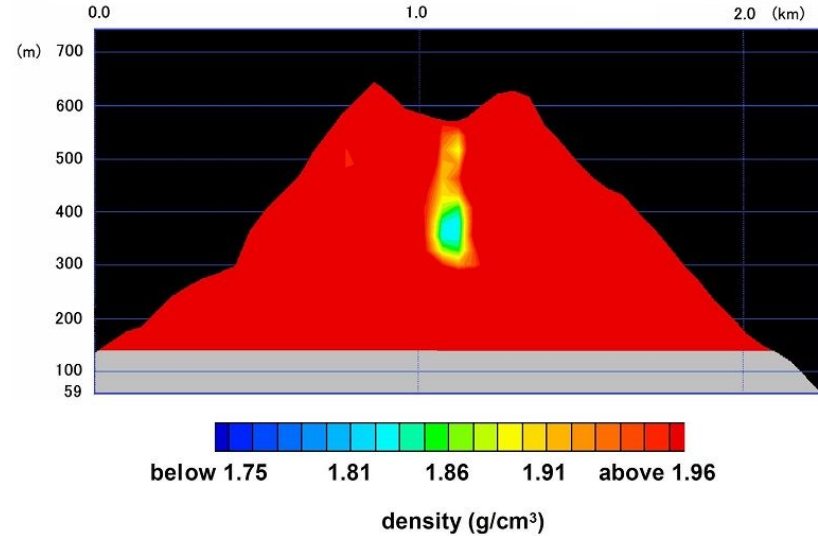
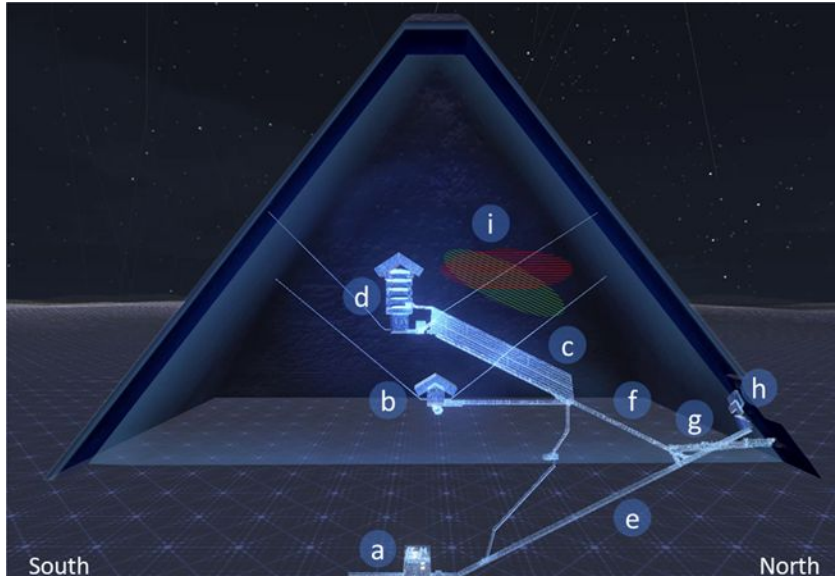
# Flujo de rayos cósmicos (ARTI)



# Muografia



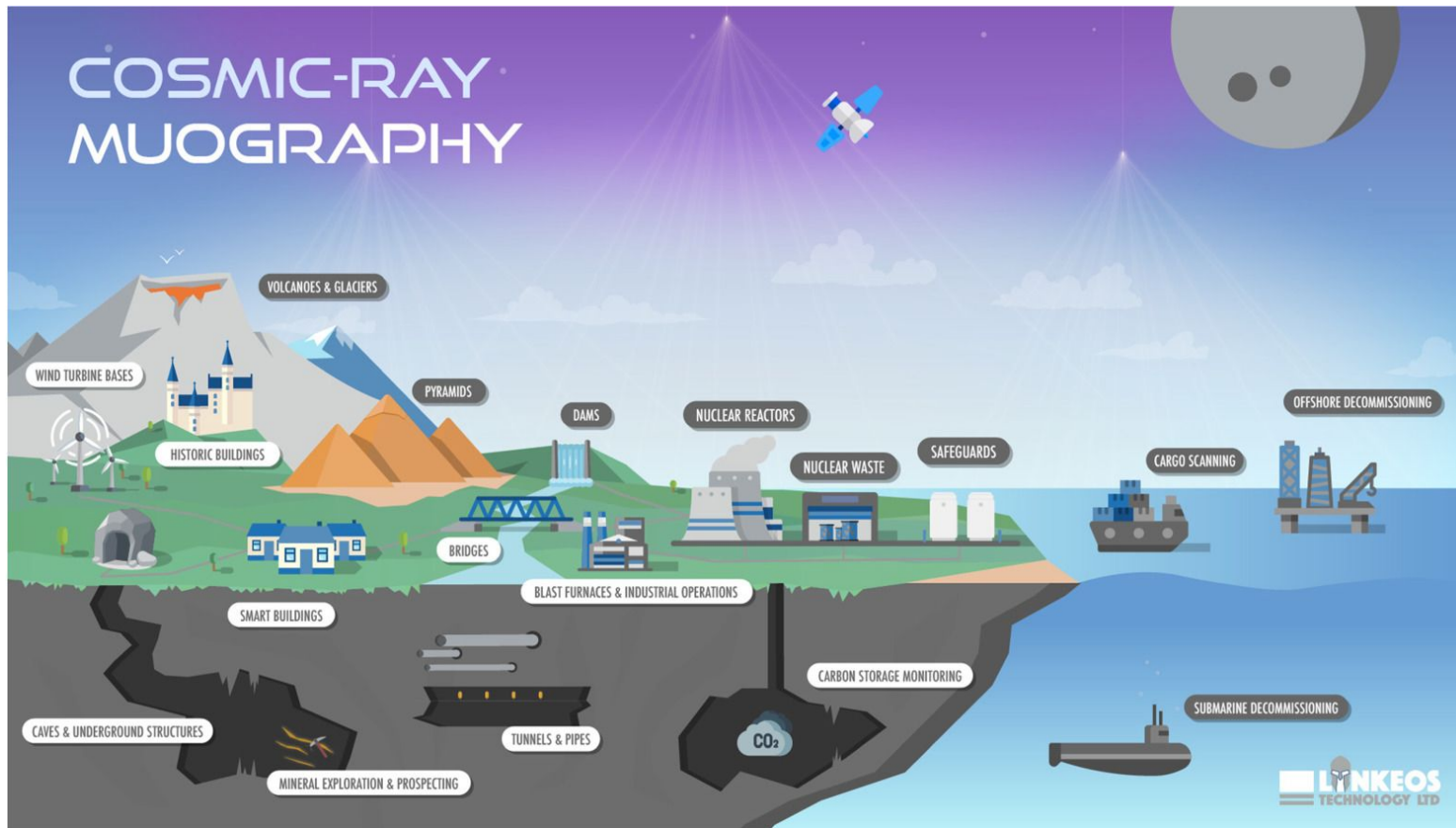
# Muografia



Tanaka, H.K.M., Bozza, C., Bross, A. et al. Muography. *Nat Rev Methods Primers* 3, 88 (2023).  
<https://doi.org/10.1038/s43586-023-00270-7>



# Muografia

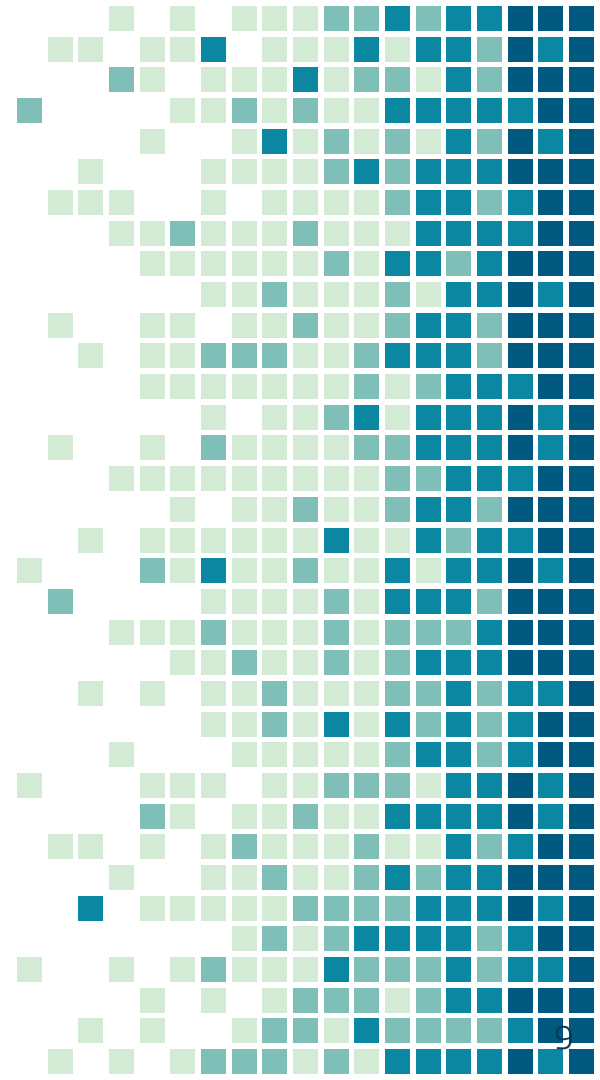




2.

# Volcán Cerro Machín

Cajamarca, Tolima - Colombia





# Volcán Cerro Machín



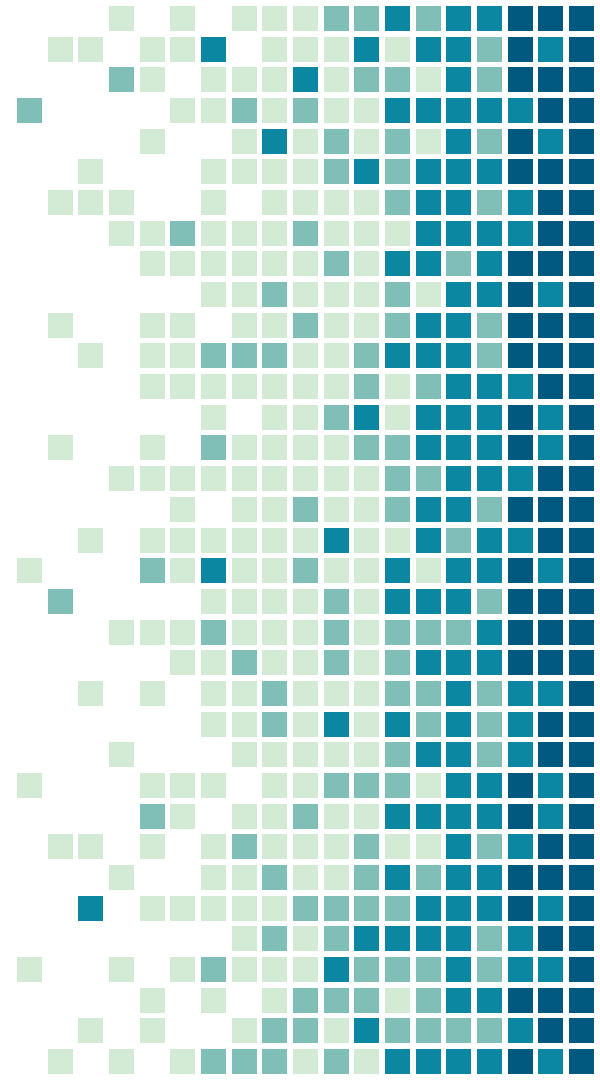


MuTe Project

3.

MuTe2.0

Muon Telescope



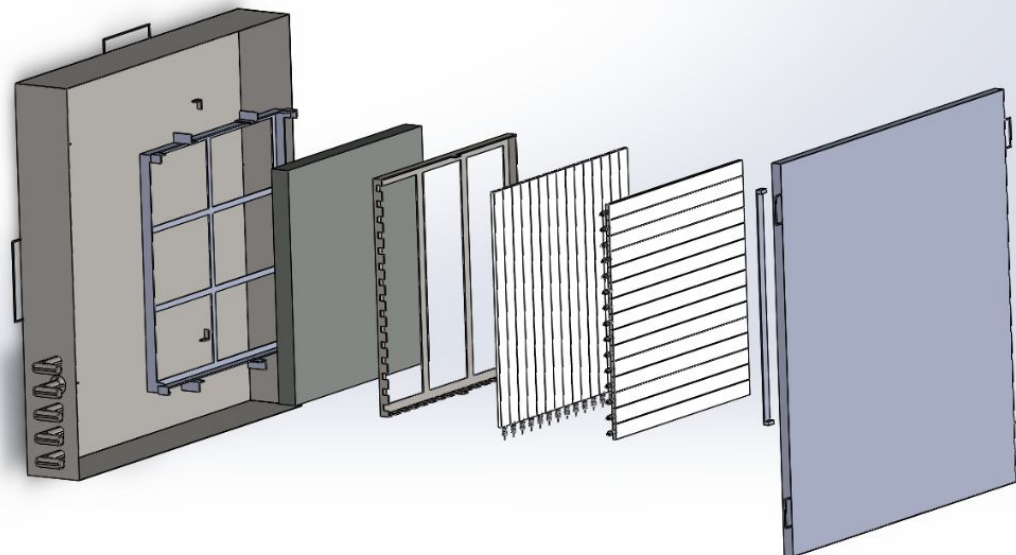
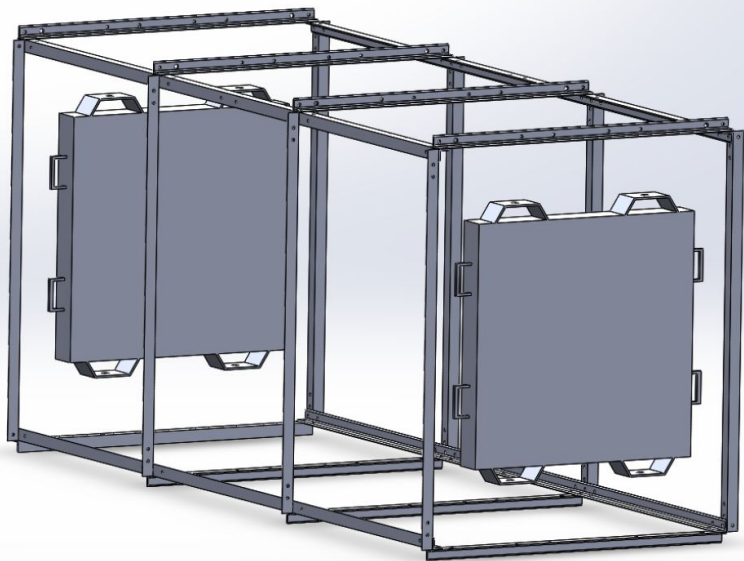
# MuTe 2.0, Muon Telescope

- Dos paneles de barras centelladoras
- Cada plano contiene 15 barras
- Cada panel tiene 225 pixeles
- La barras tiene 60 cm x 4 cm x 1 cm
- Usa SiPM al final de cada barra para recolectar la señal
- Blindaje usando 3 cm de Pb

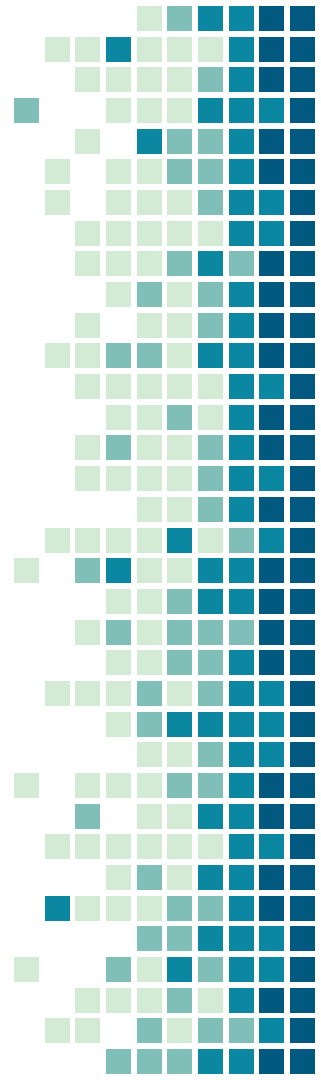
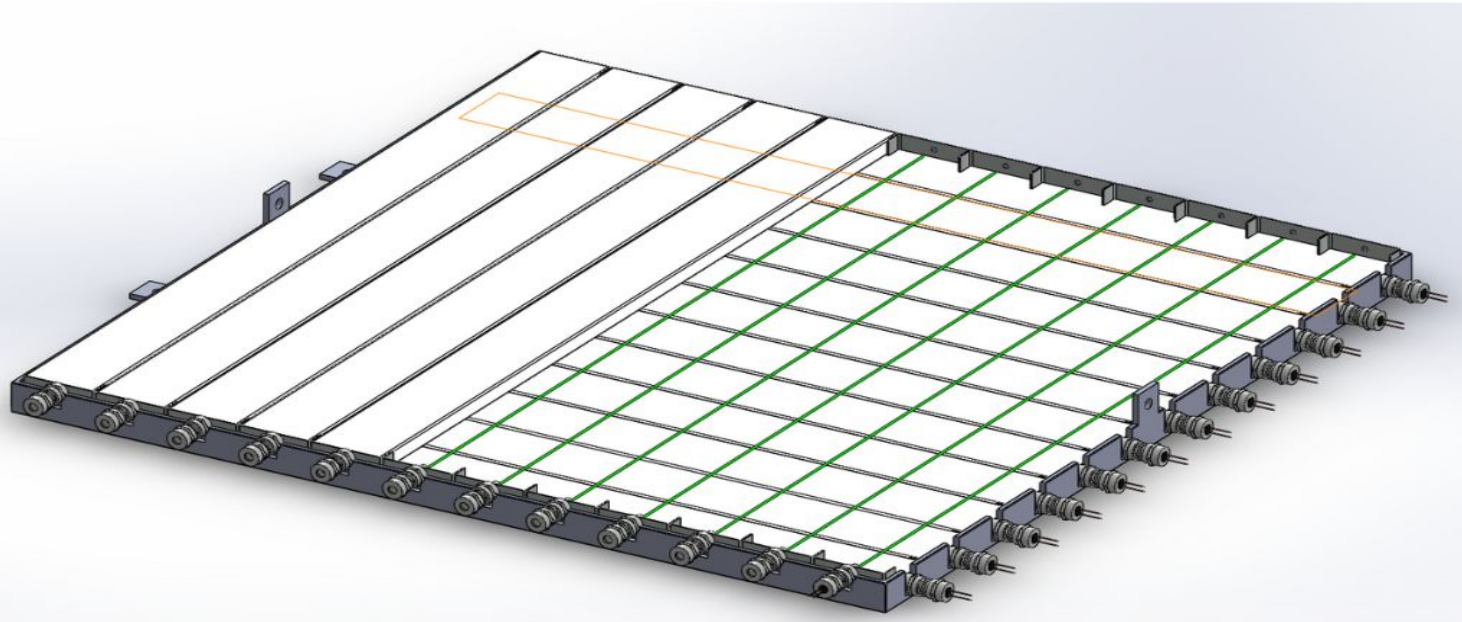




# Diseño Mecánico

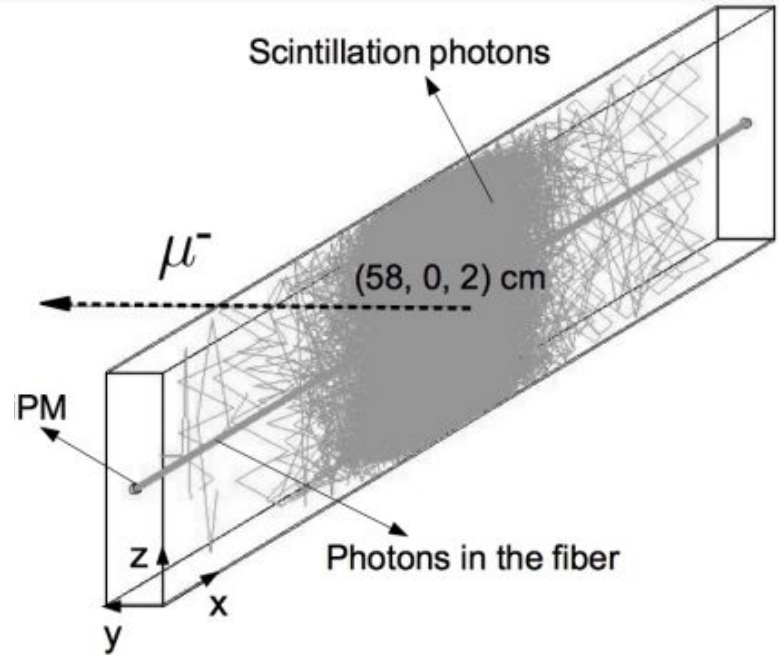
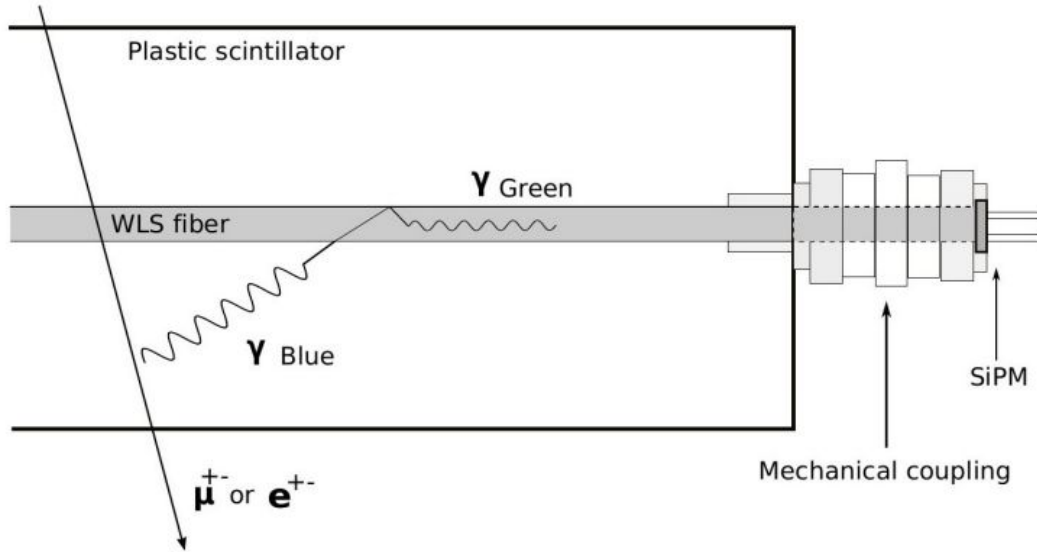


# Panel centellador

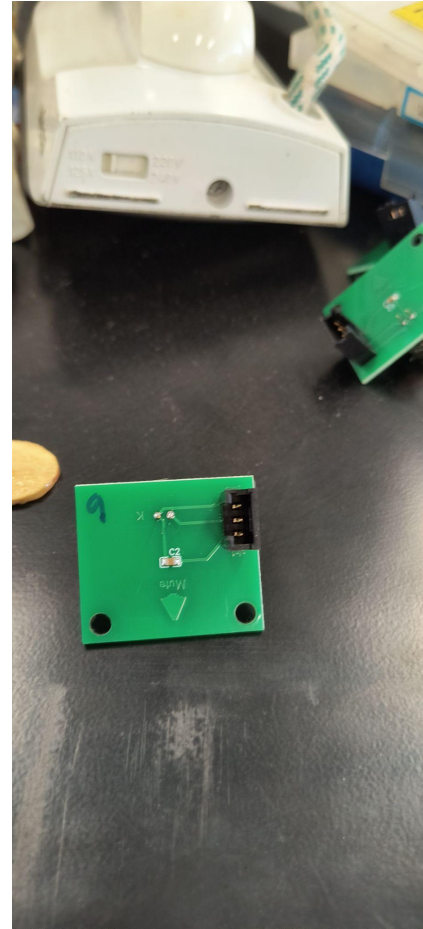
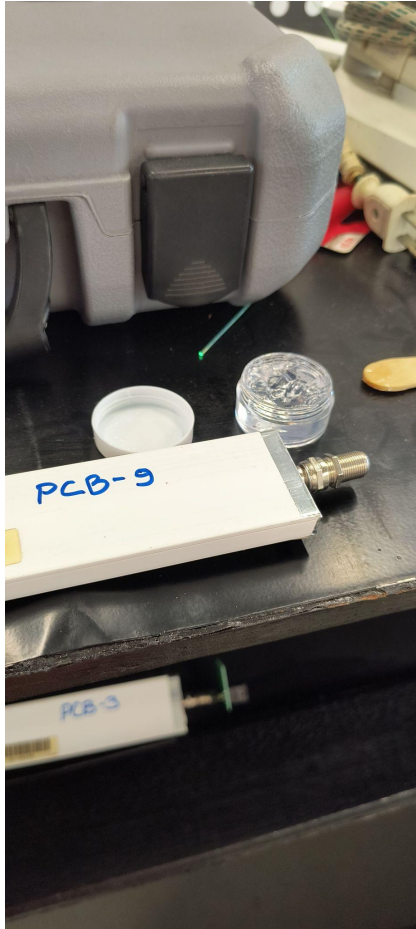




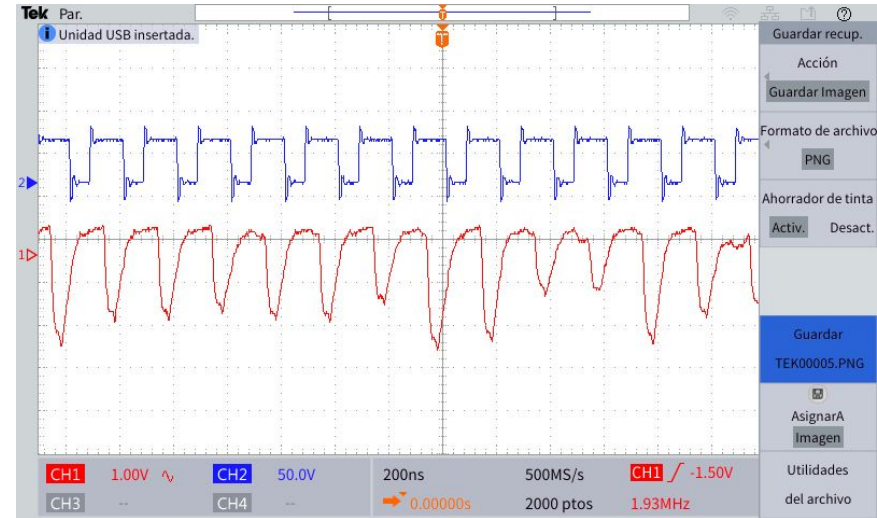
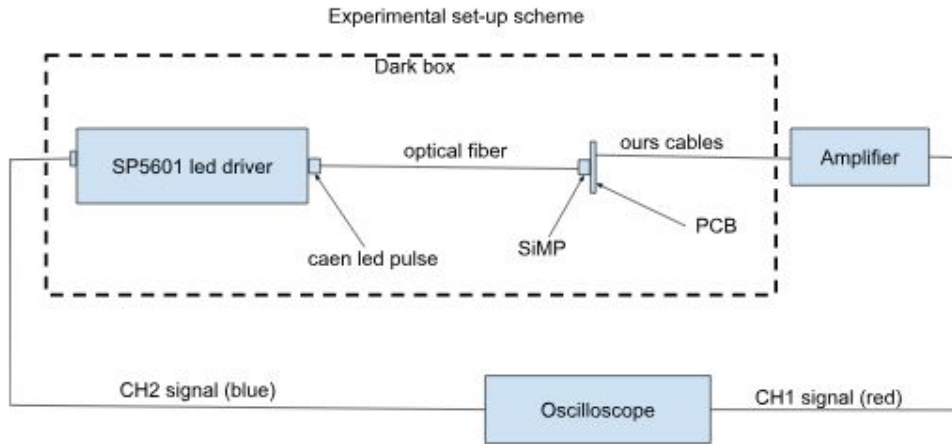
# Barras centelladoras



# Barra-Cable-PCB

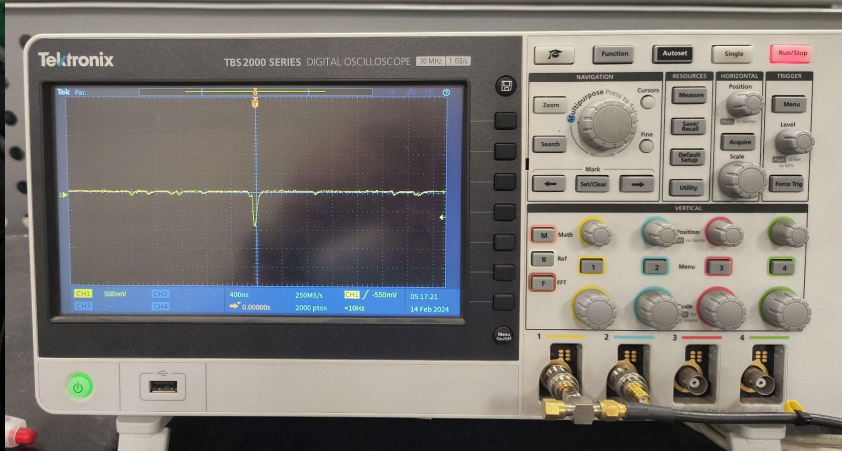
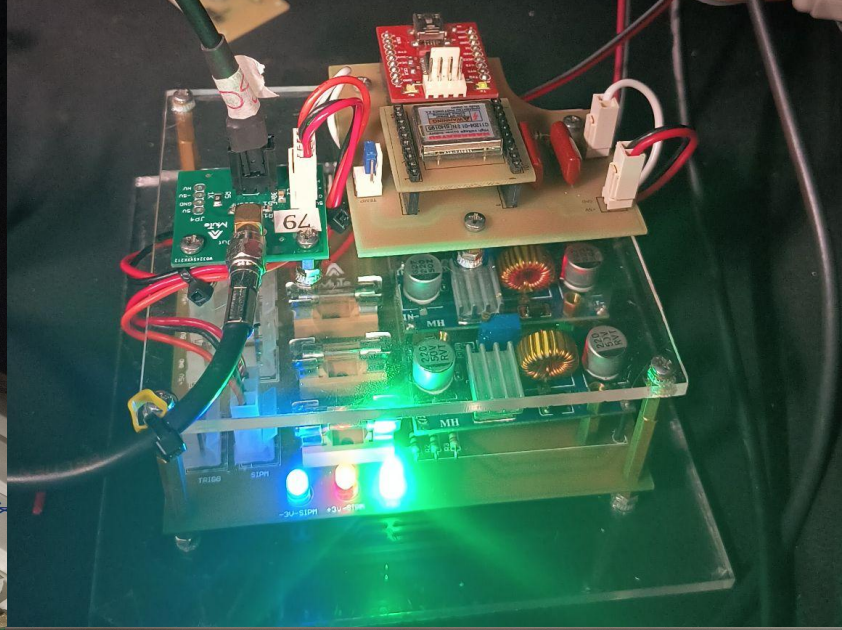


# Prueba de los cables

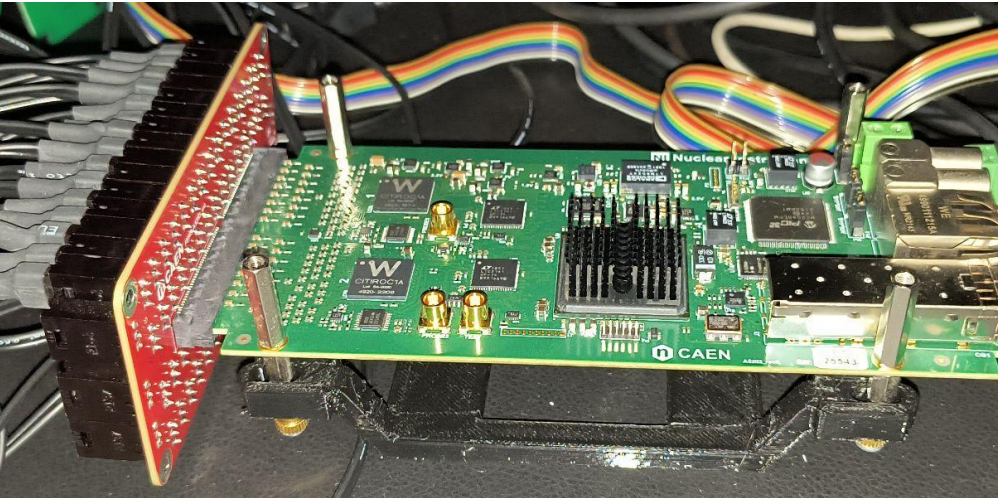




# Sistema barra-SiPM -Fibra



# Sistema de adquisición

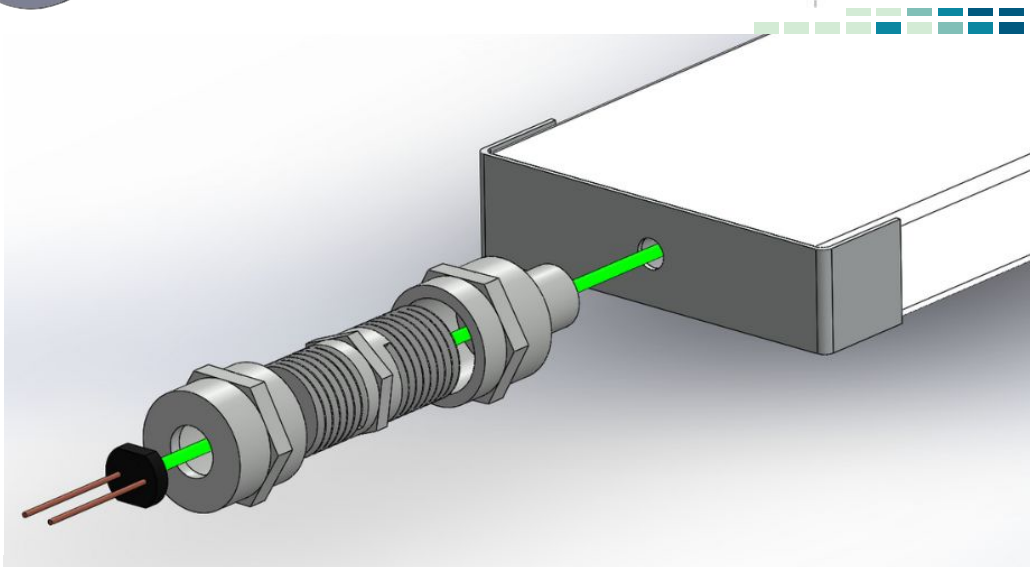
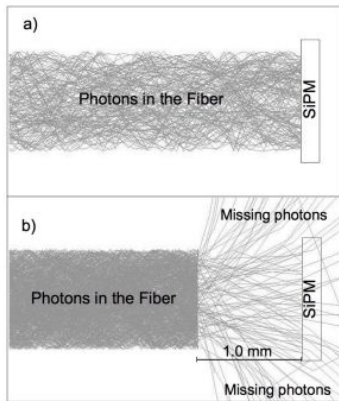
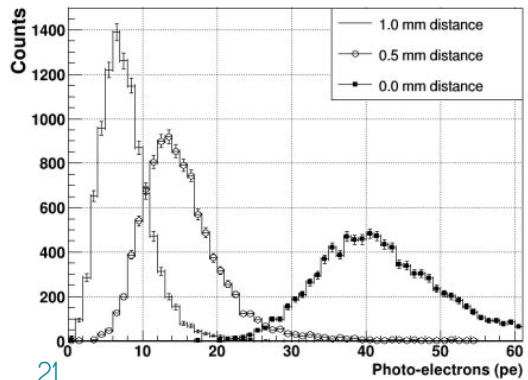
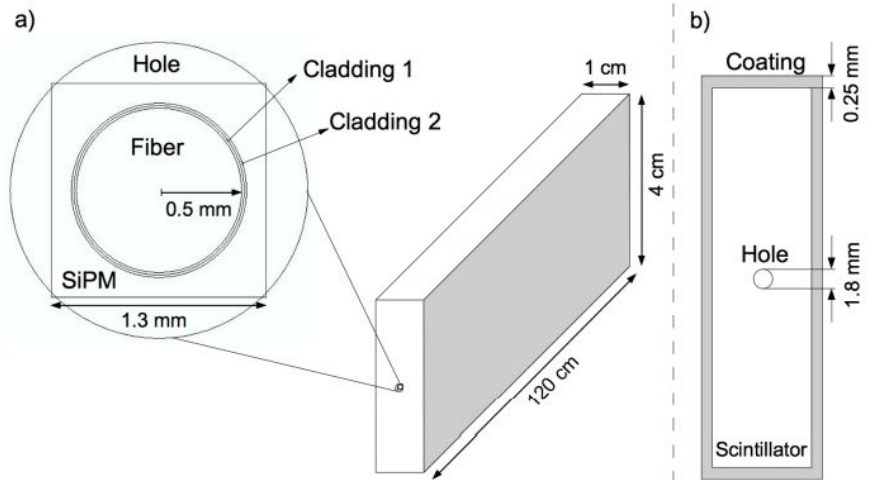
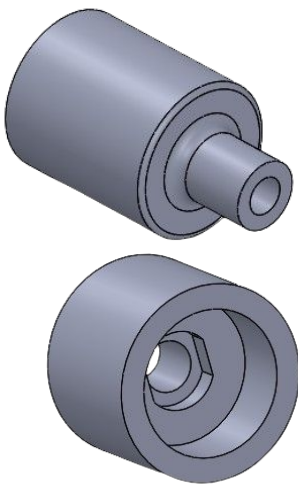


CAEN FERS-5200 DAQ, 64 Ch: convertidores AD, Logical Trigger, sincronización, memoria local e interfaz de lectura.

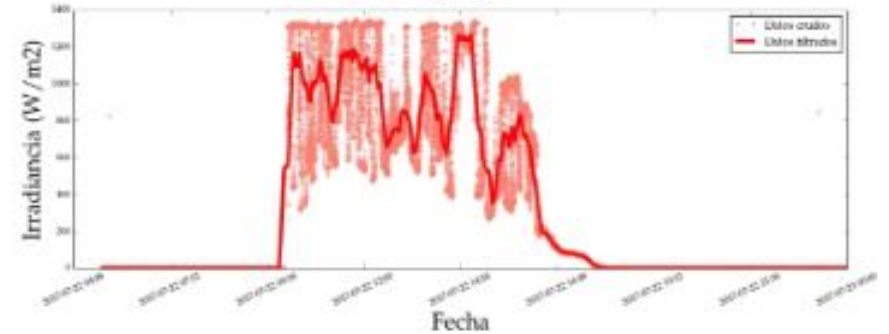
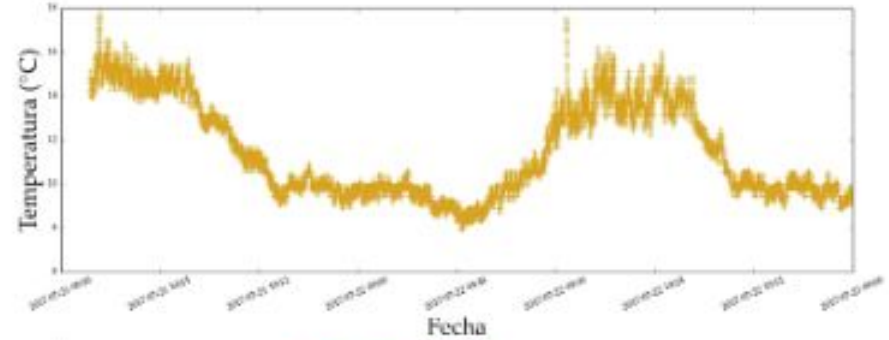
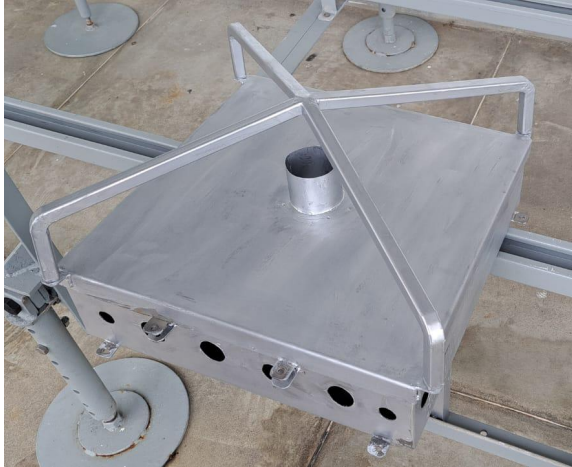
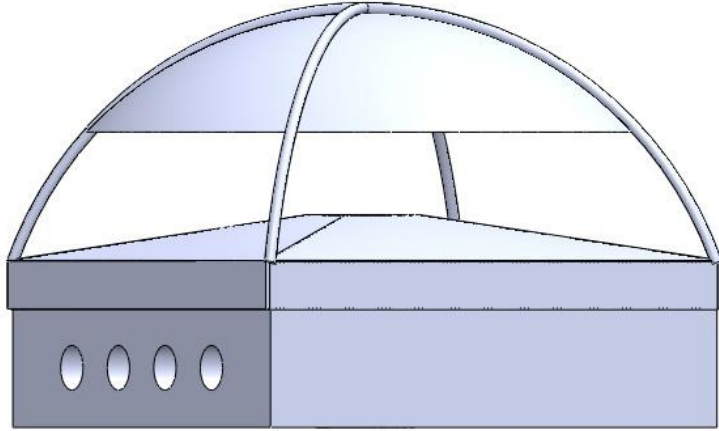
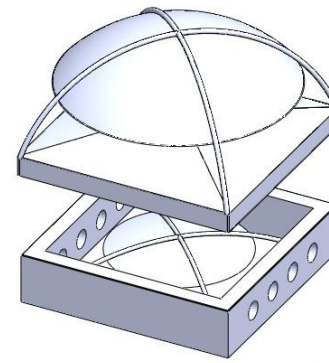




# Acople SiPM-Fibra

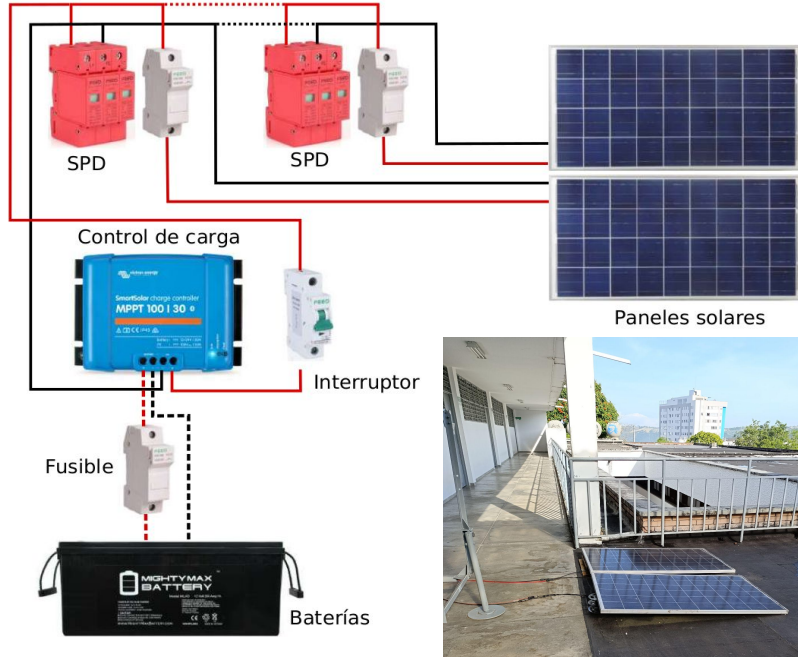


# Caja térmica para la electrónica

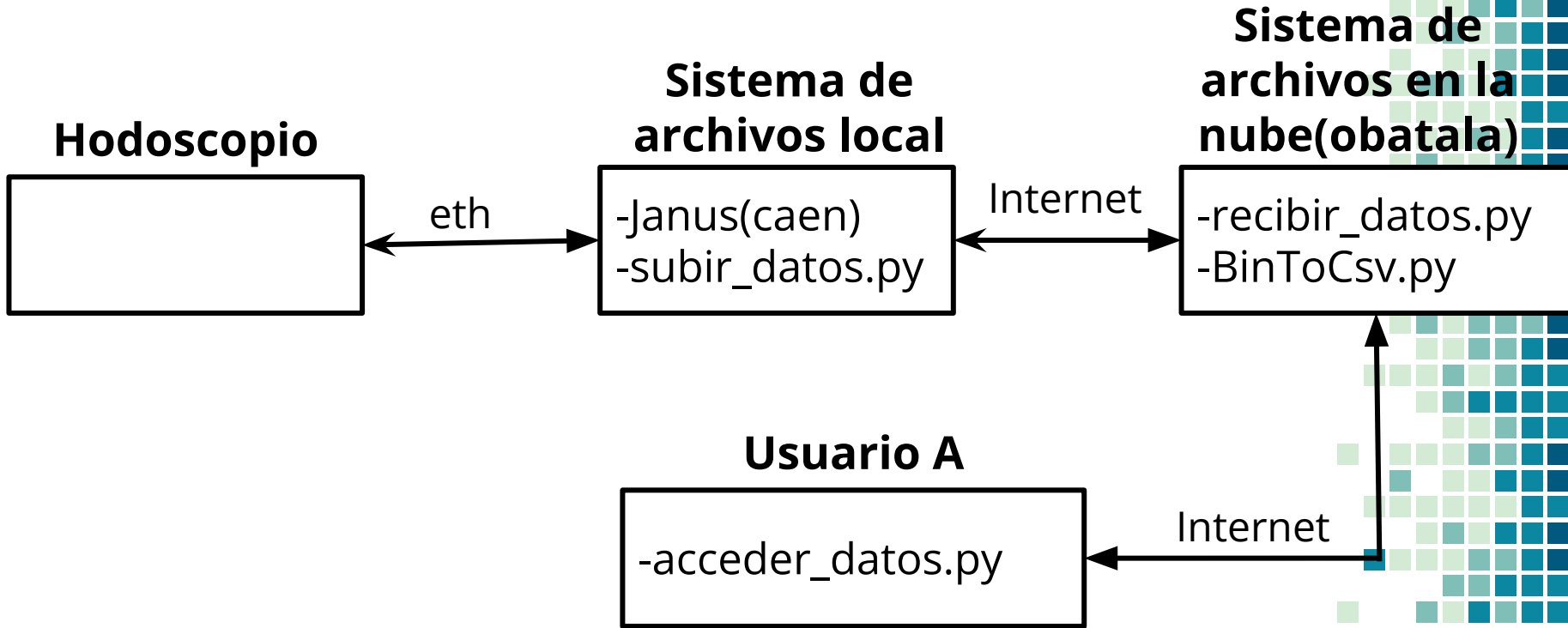




# Sistema Fotovoltaico de respaldo



# Sistema de gestión de datos

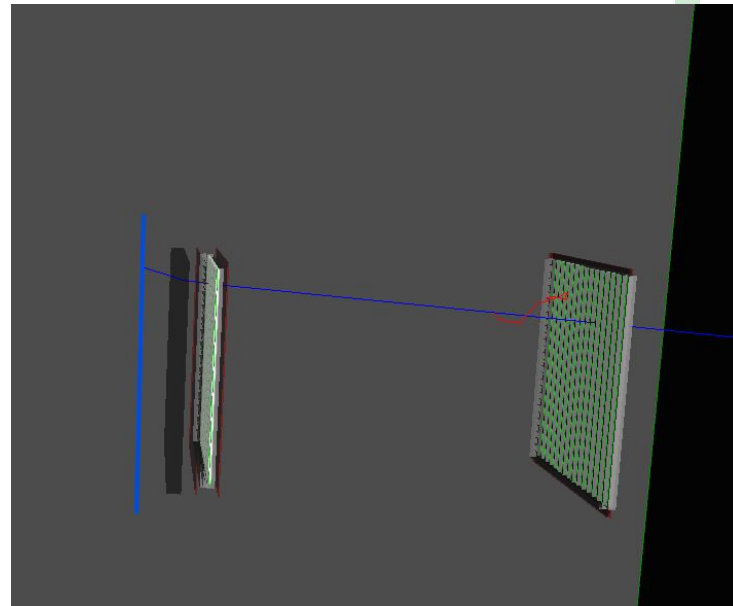
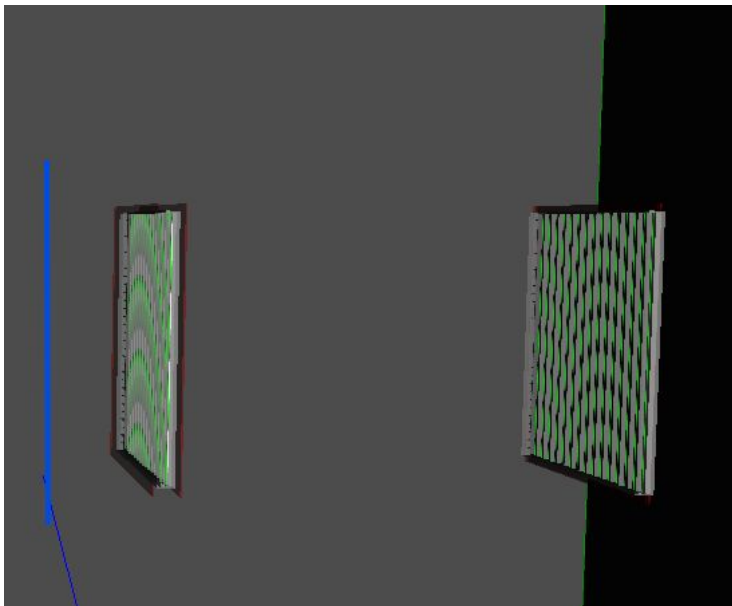


# MuTe 2.0



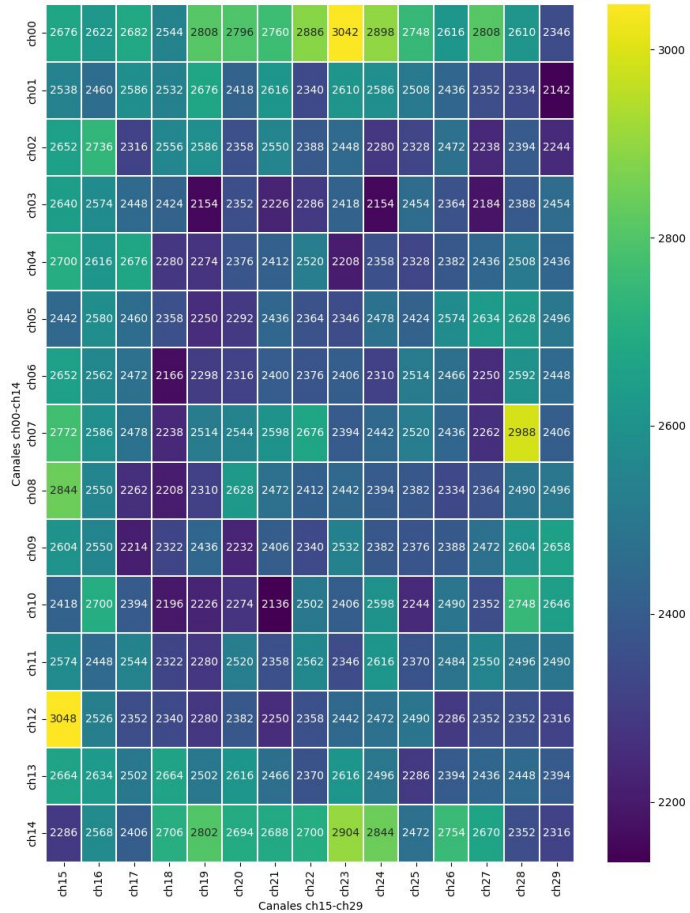
# Esquema de Simulación

Inyección de 1 Hora de flujo Bga en un círculo de  $1\text{m}^2$  de Área a  $0.5\text{cm}$  del Hodoscopio, con y sin Pb.

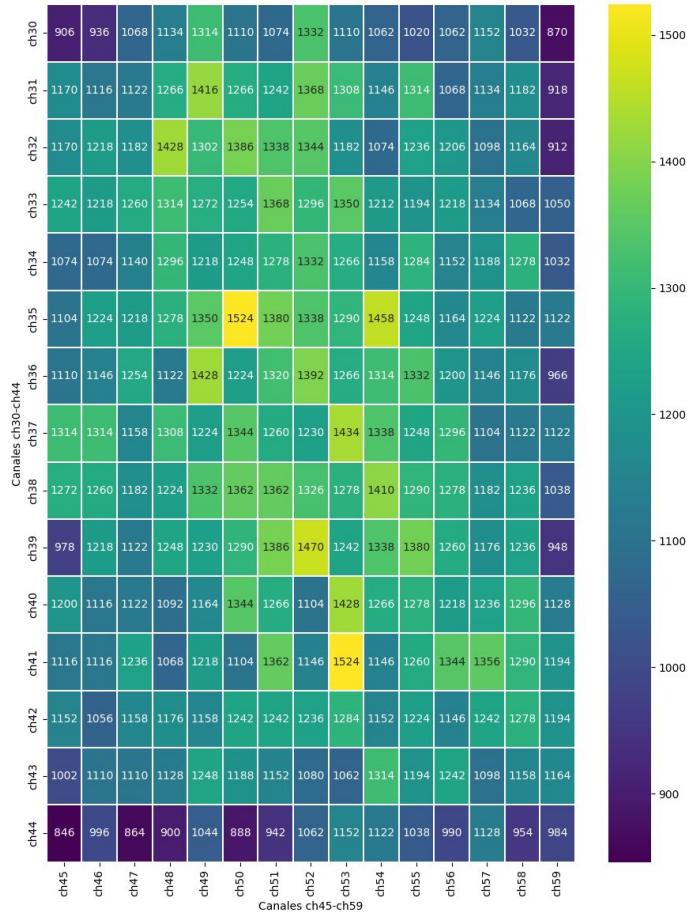


# Mapa de Píxeles

Coincidencias de Activaciones entre Pares de Canales (ch00-ch14 vs ch15-ch29) - 1H



Coincidencias de Activaciones entre Pares de Canales (ch30-ch44 vs ch45-ch59) - 1H







# Agradecimientos

Proyecto " Integración de muongrafía con métodos geofísicos estándar para la construcción de un modelo 3D de densidad: aplicación al Volcán Cerro Machín" , financiado con recursos de Minciencias por medio de la convocatoria 890 de 2020 y administrados por el ICETEX mediante contrato No. 2022-0718.