

Resumen final

*Reunión de la División de Rayos Cósmicos de la Sociedad Mexicana de Física 2021
24 de Noviembre de 2021*

Tomás Capistrán

IA-UNAM

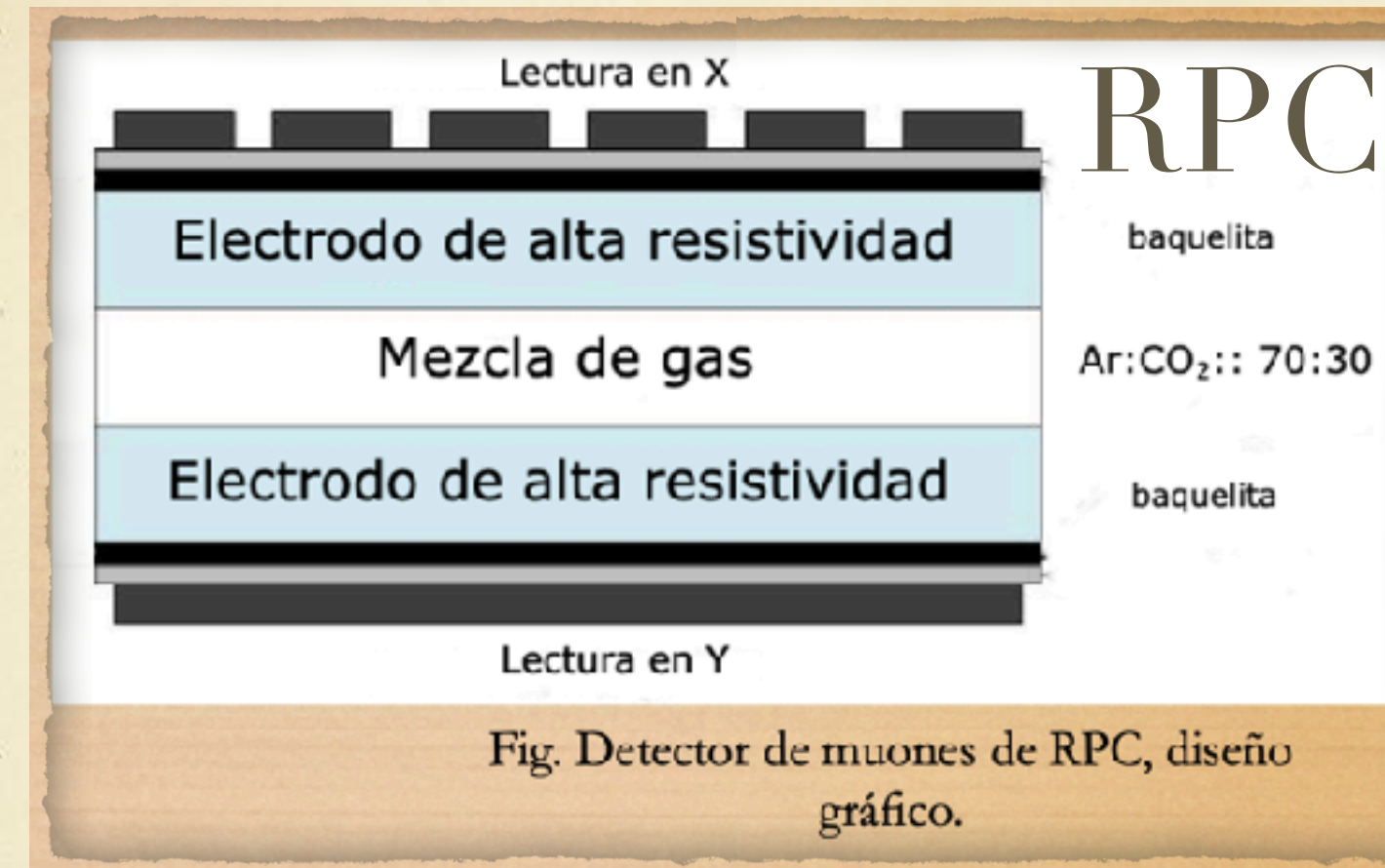
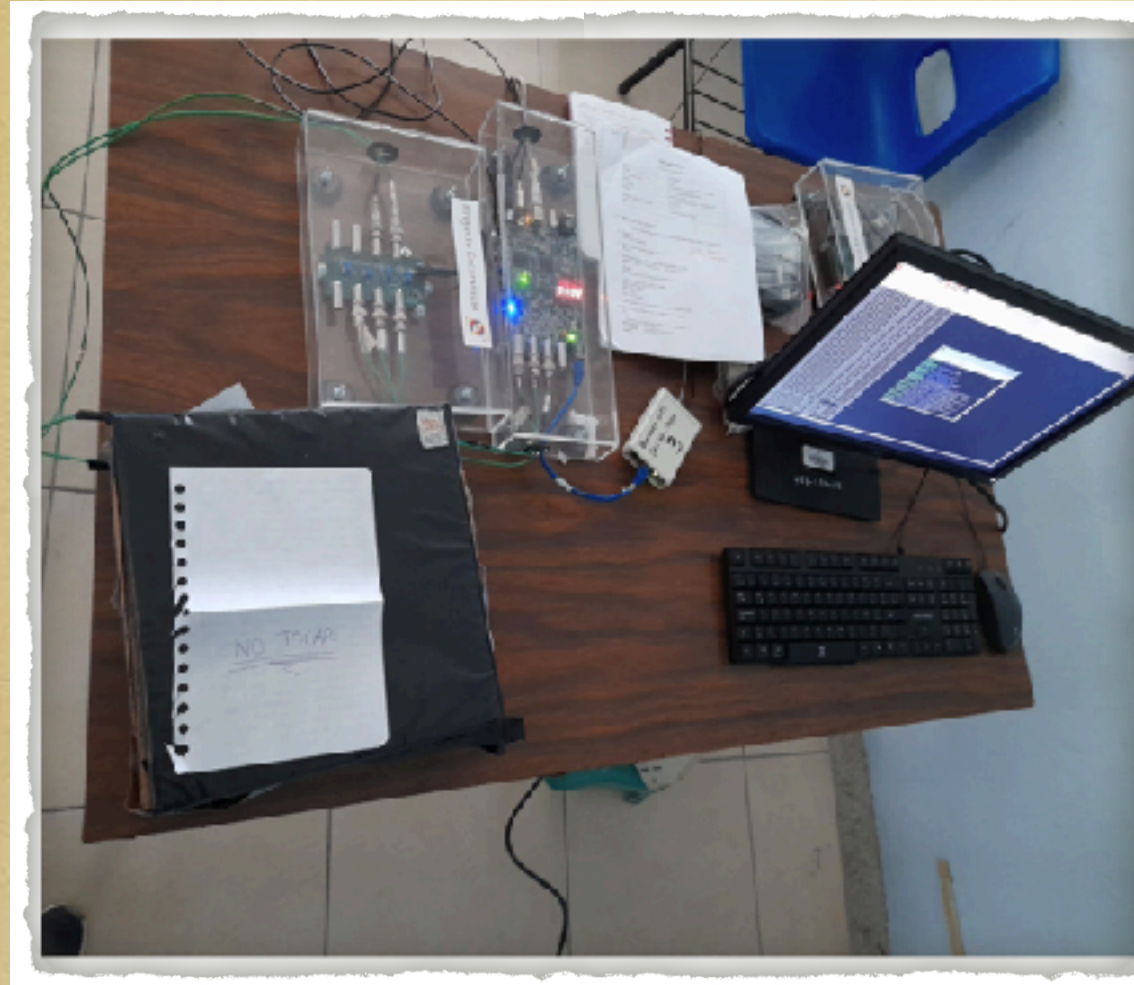
Contribuciones

	Monday 22 November 2021	1
4	Welcome	1
	Talks: Session 1	1
	3 Talks: Session 2	1
	LA INVESTIGACIÓN EN RAYOS CÓSMICOS EN MÉXICO: APUNTES PARA UNA HISTORIA OCTOGENARIA	1
	Lecture	1
	Tuesday 23 November 2021	2
4	Talks: Session 3	2
	Búsqueda de materia oscura por detección directa	2
	Exploring the Universe at the highest energies with the Cherenkov Telescope Array	2
	Lecture	2
	Wednesday 24 November 2021	3
4	Talks: Session 4	3
	2 Talks: Session 5	3
	Assembly	3
	Lecture	3
	Final Summary	3

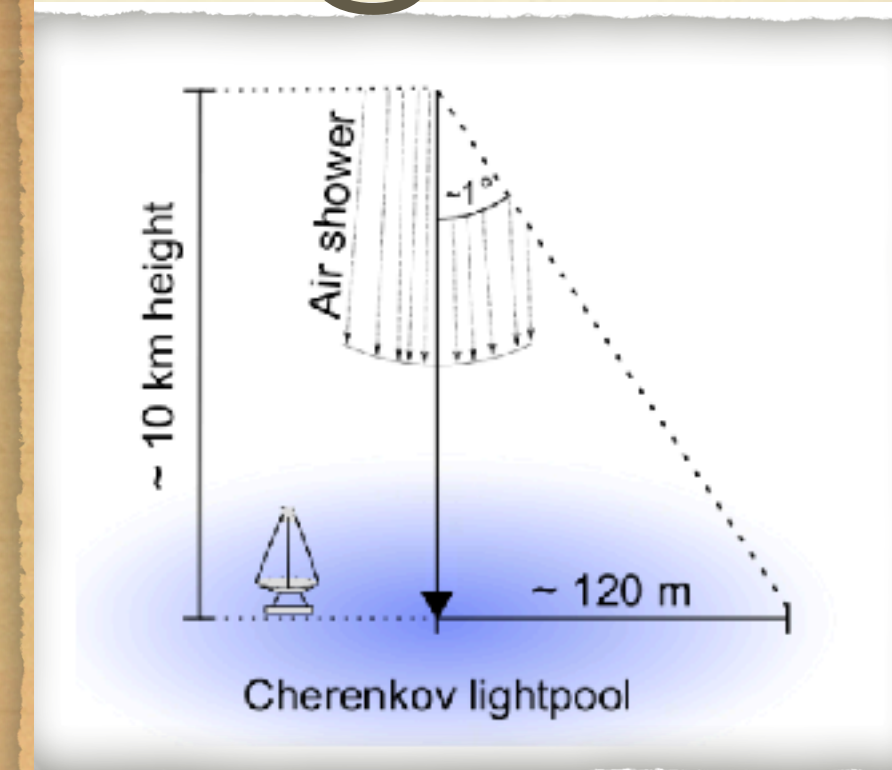
20 Charlas en total
3 invitadas
1 curso de RCs

Instrumentos

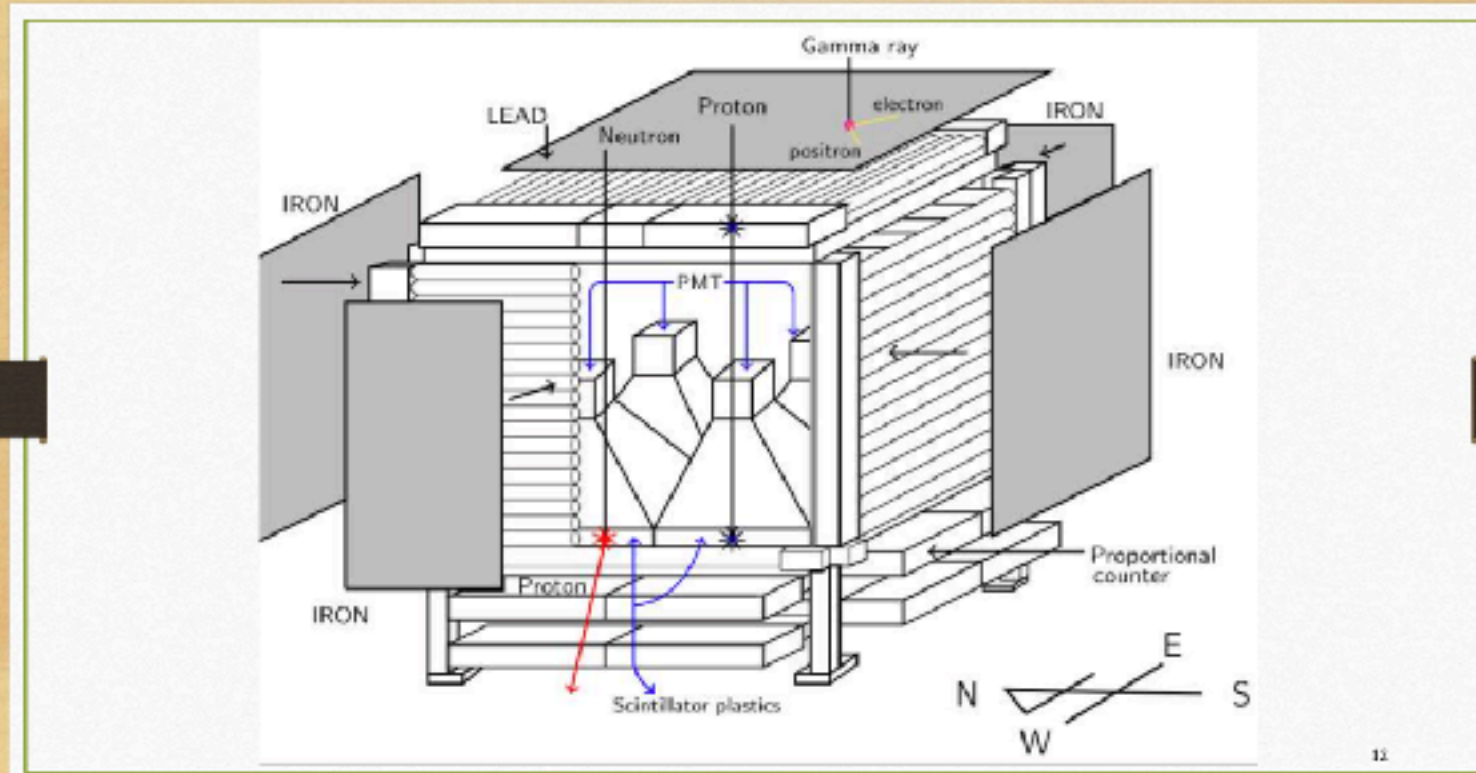
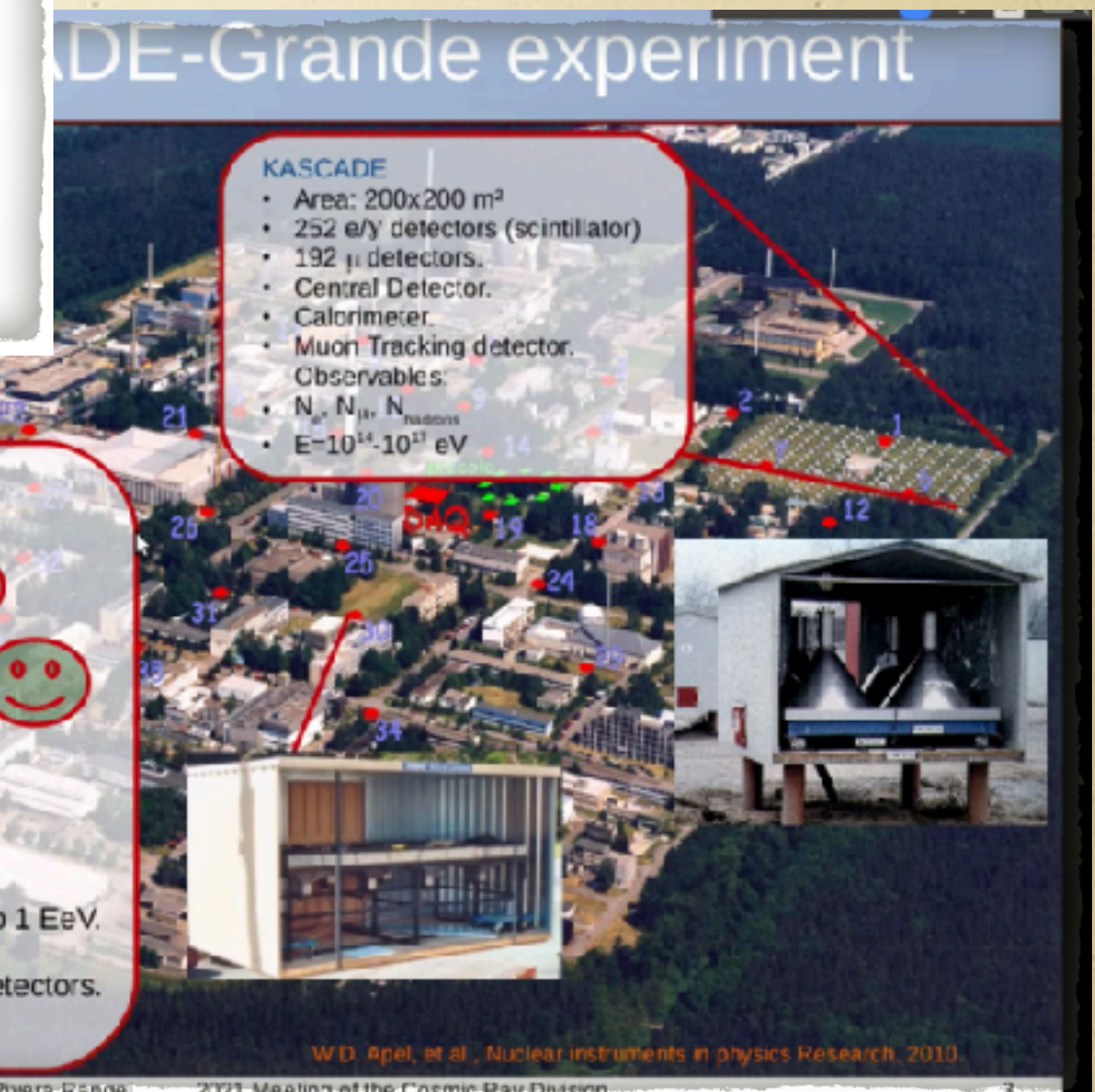
Detector escaramujo



M@ate

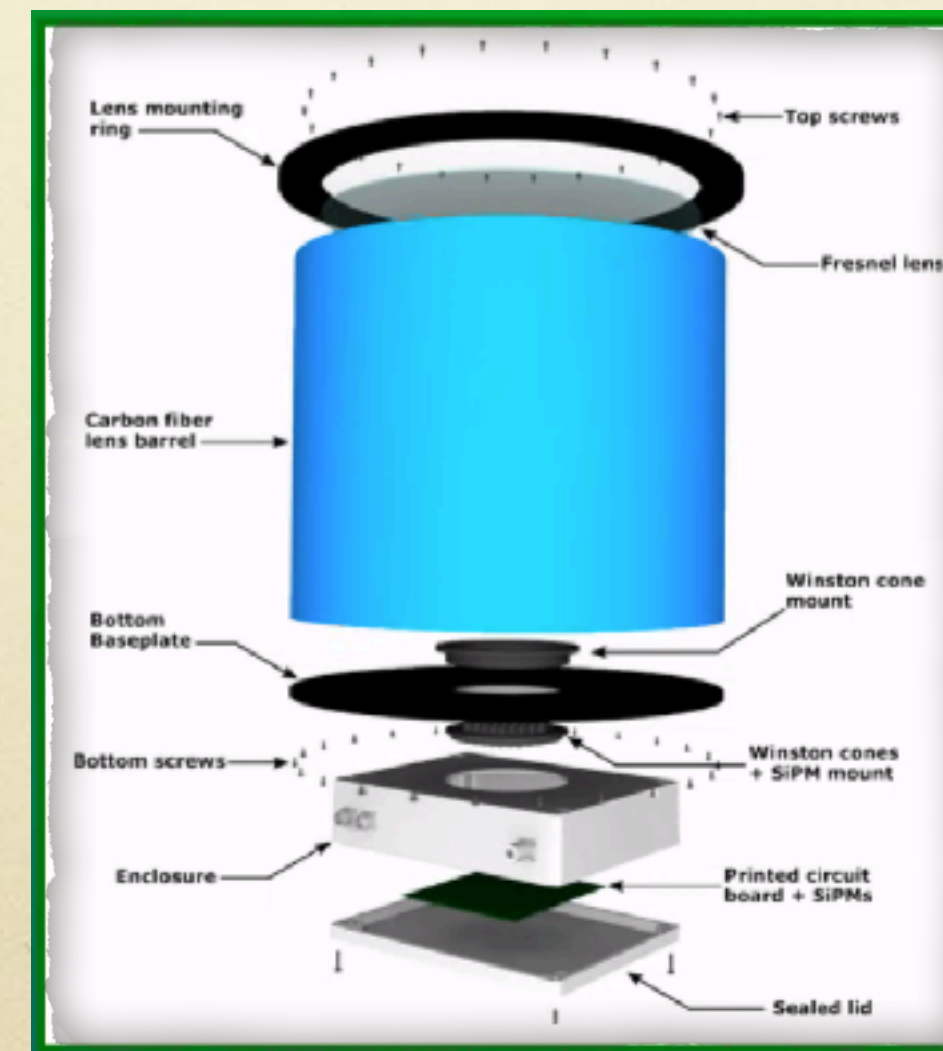


HAWC



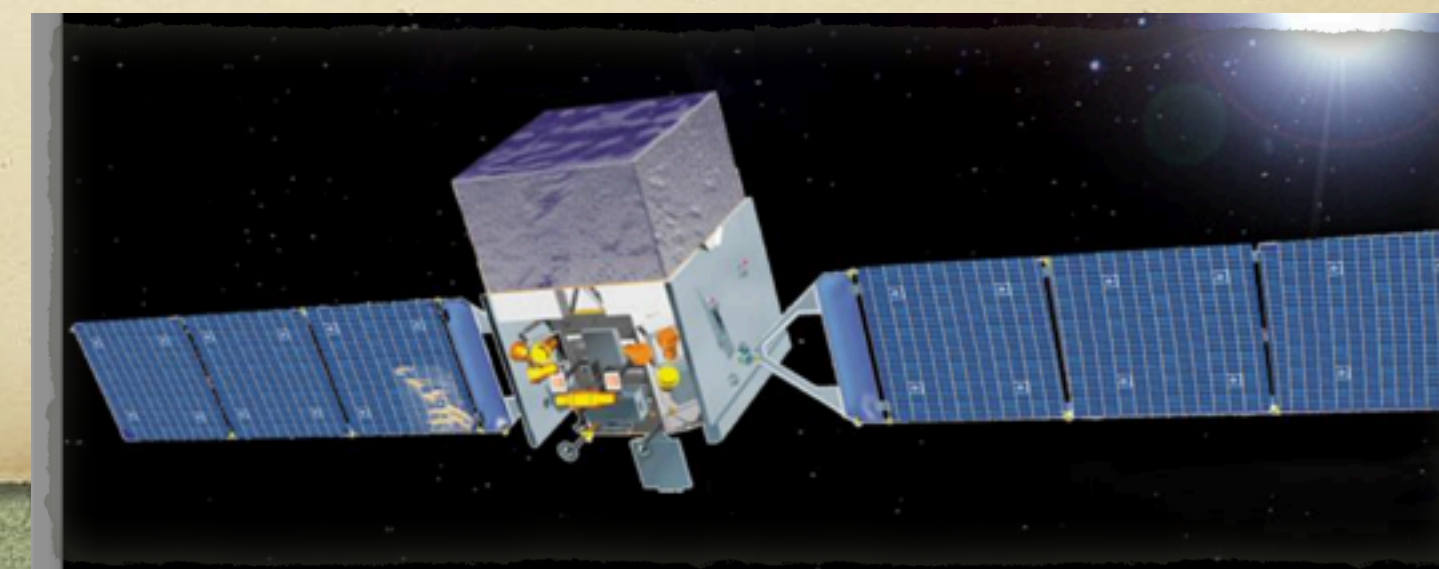
SNT Structure. Taken from [4]

Solar Neutron Telescope



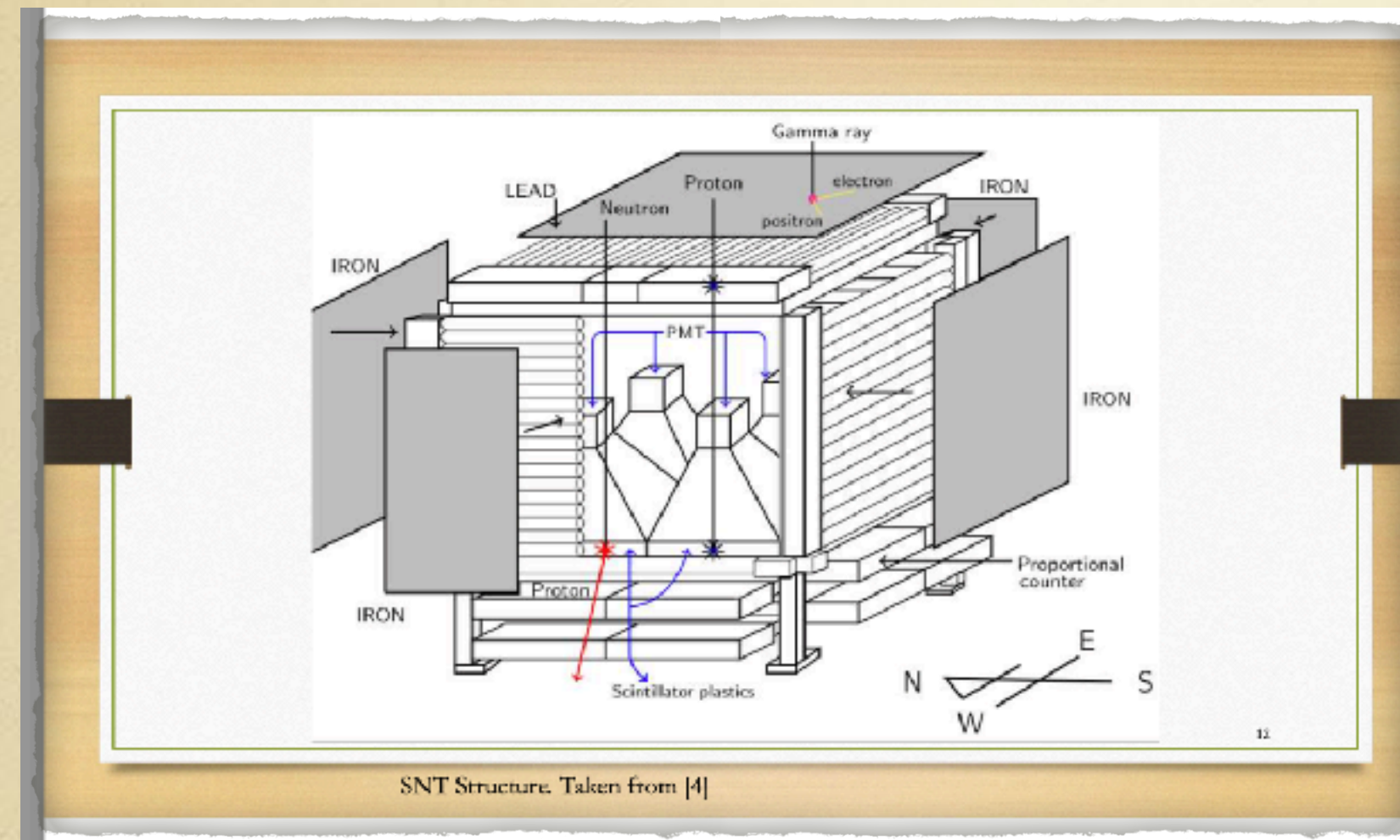
HAWC-Eye

KASCADE-Grande Experiment

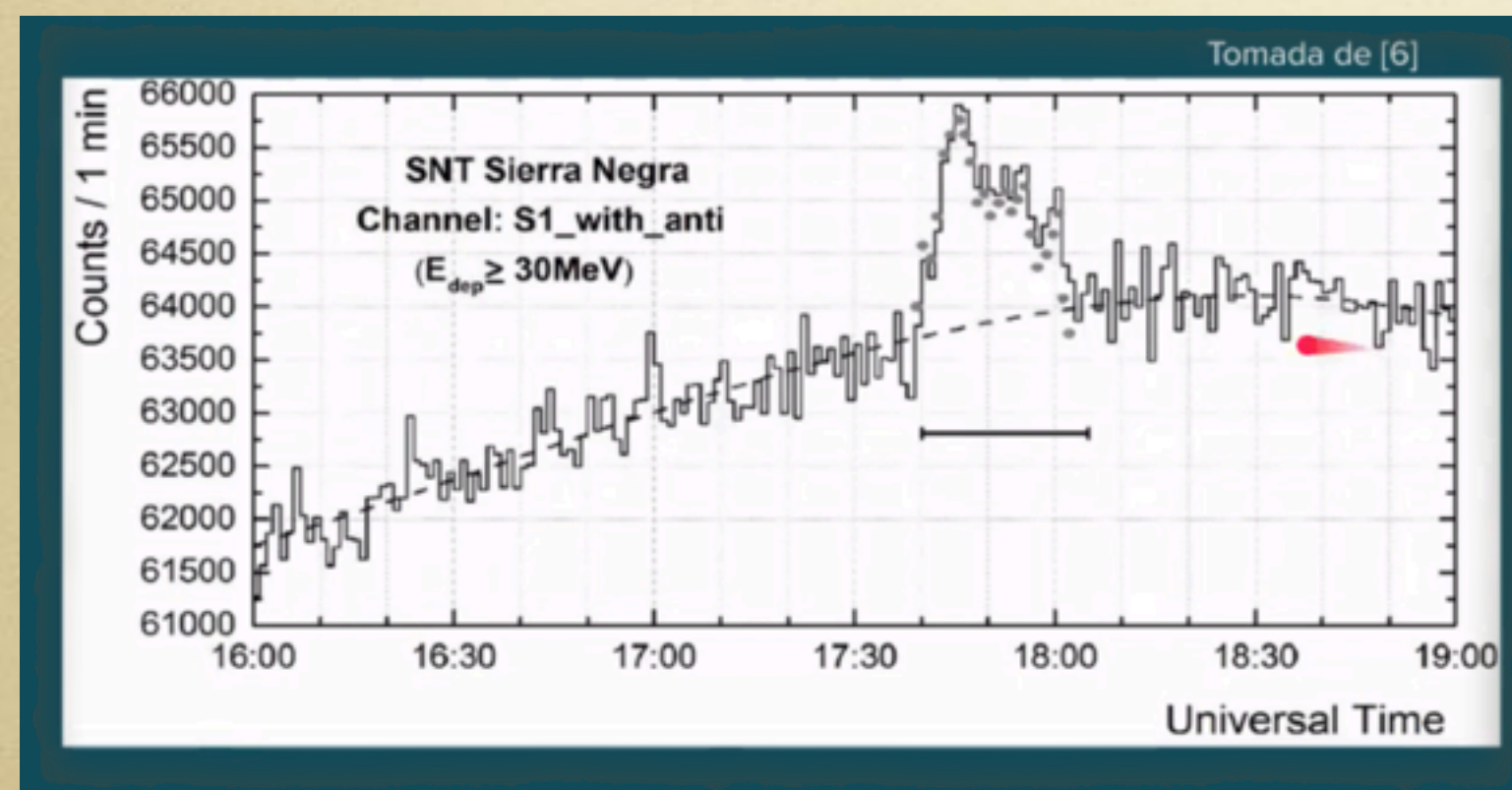


Fermi-LAT

Telescopio de neutrones solares & Space Environment Data Acquisition Attached Payload (FIB SEDA-AP) de la agencia espacial Japonesa



Diapositiva 12 de Jania Newton



Diapositiva 9 de Fernando Monterde

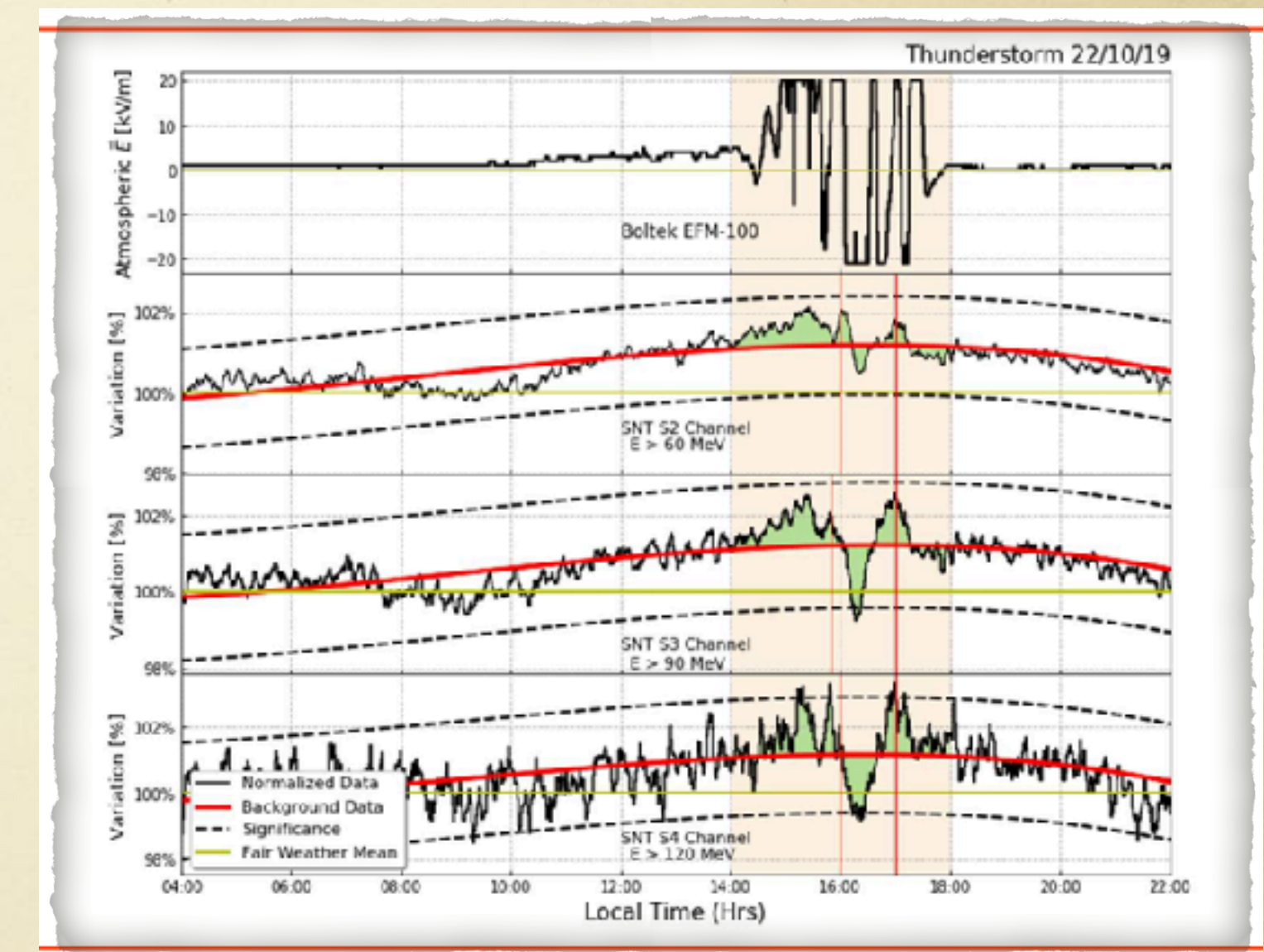
3 fulguraciones:

X17

X1.3

X3.9

Tormenta del 2019



Diapositiva 17 de Jania Newton

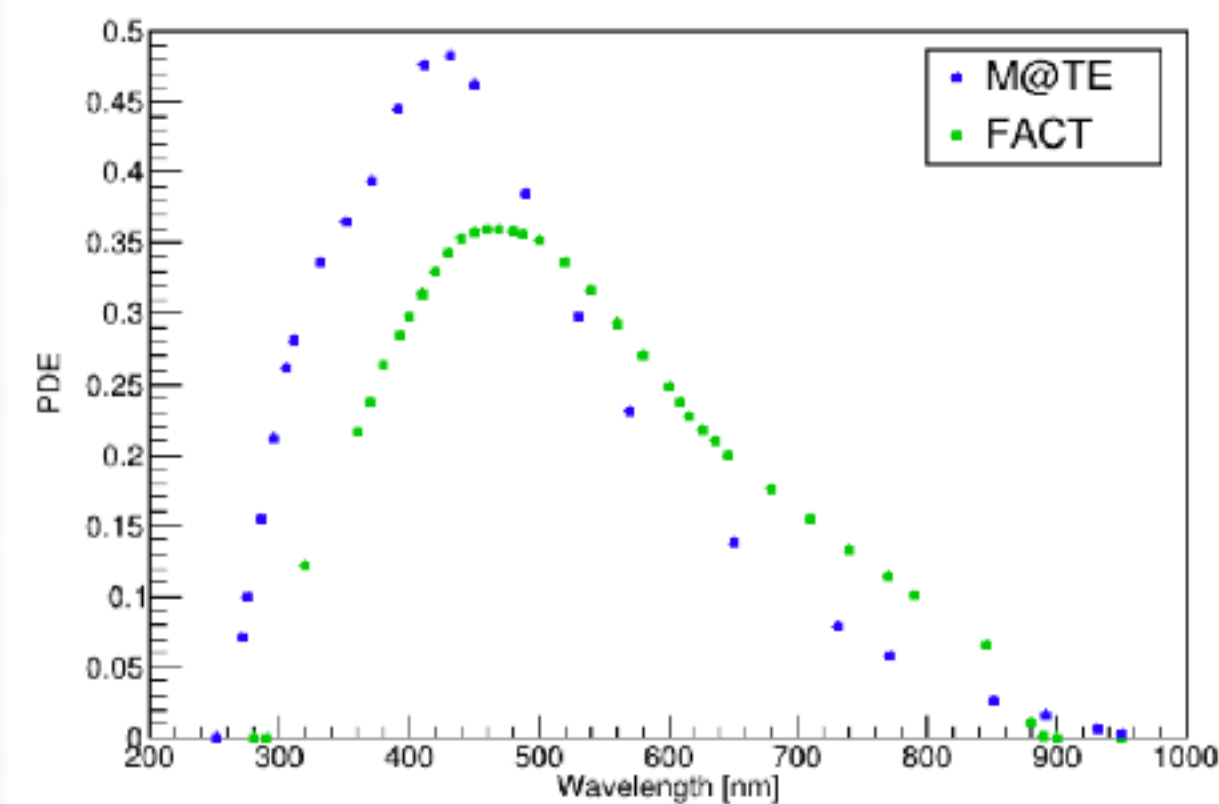


Figura 3: Comparación de PDE de los sensores de M@TE y FACT.

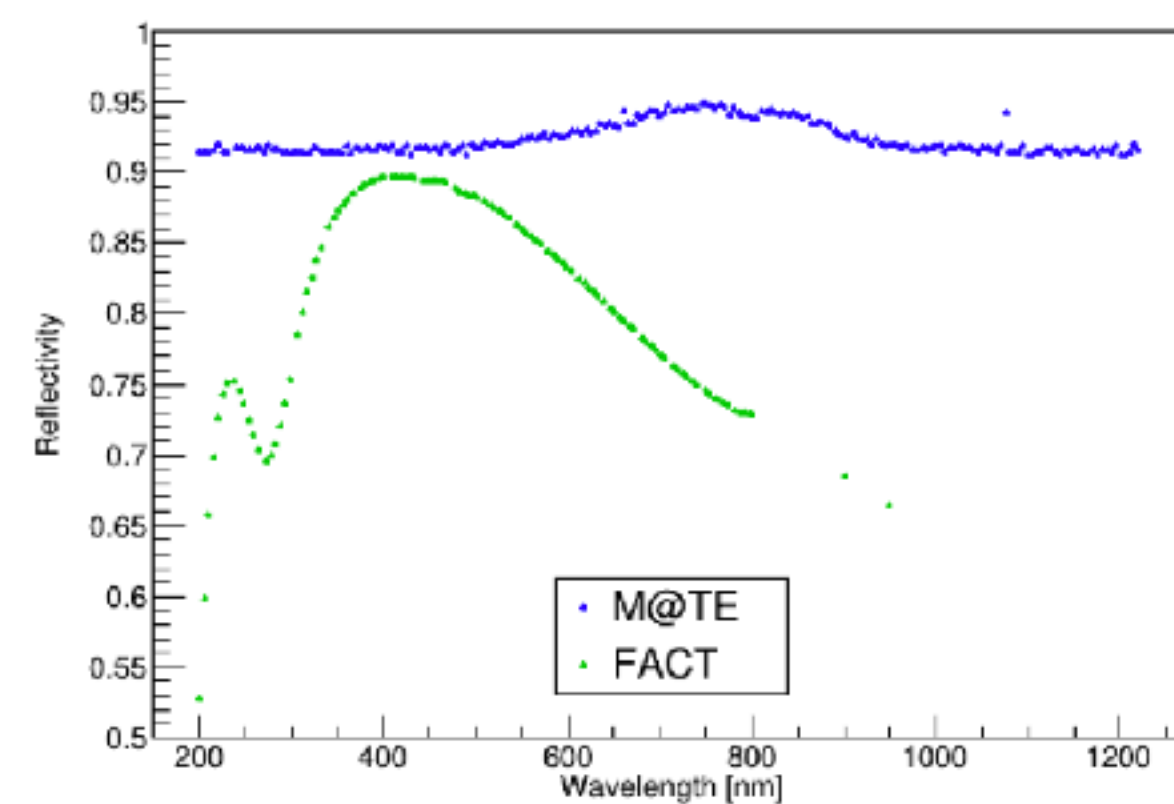


Figura 4: Comparación de reflectividad media de los espejos de M@TE y FACT.

Simulaciones adaptadas a
M@TE

Diapositiva 7 de Josue Cuzco

Estimación de Energía
usando Random Forest

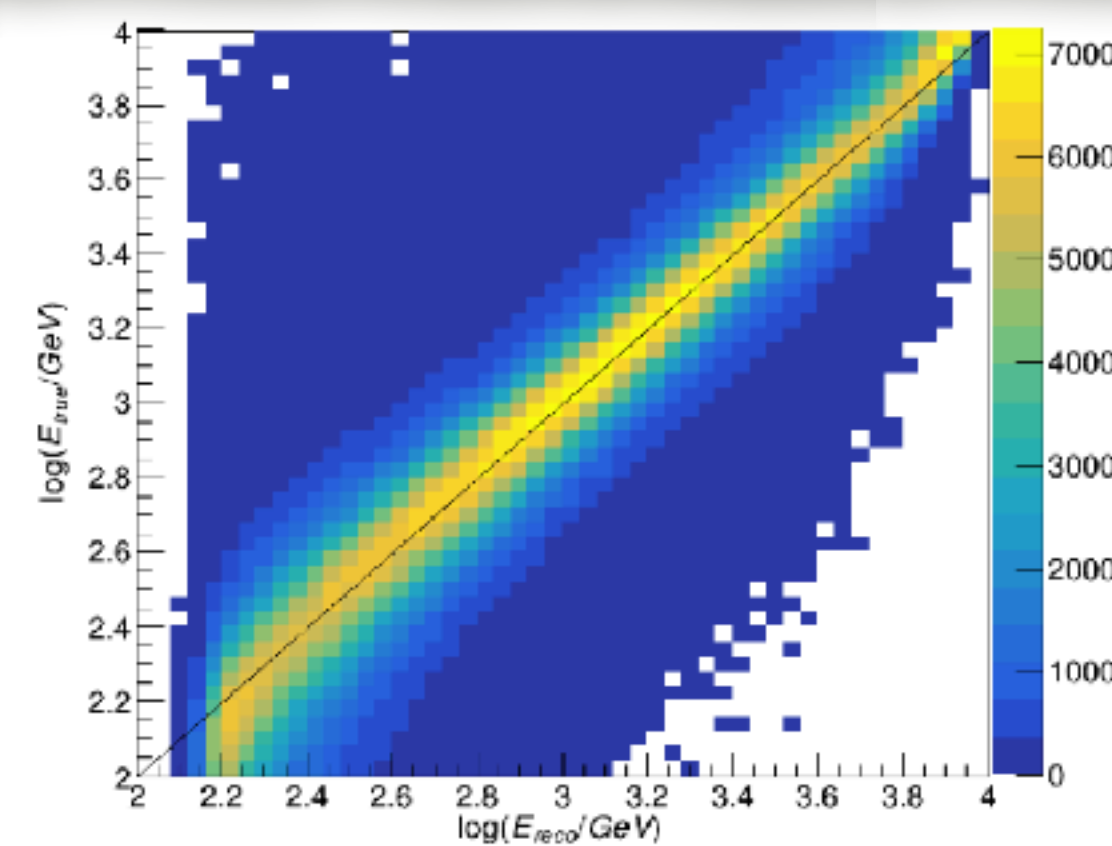


Figura 8: Energía verdadera y energía reconstruida.

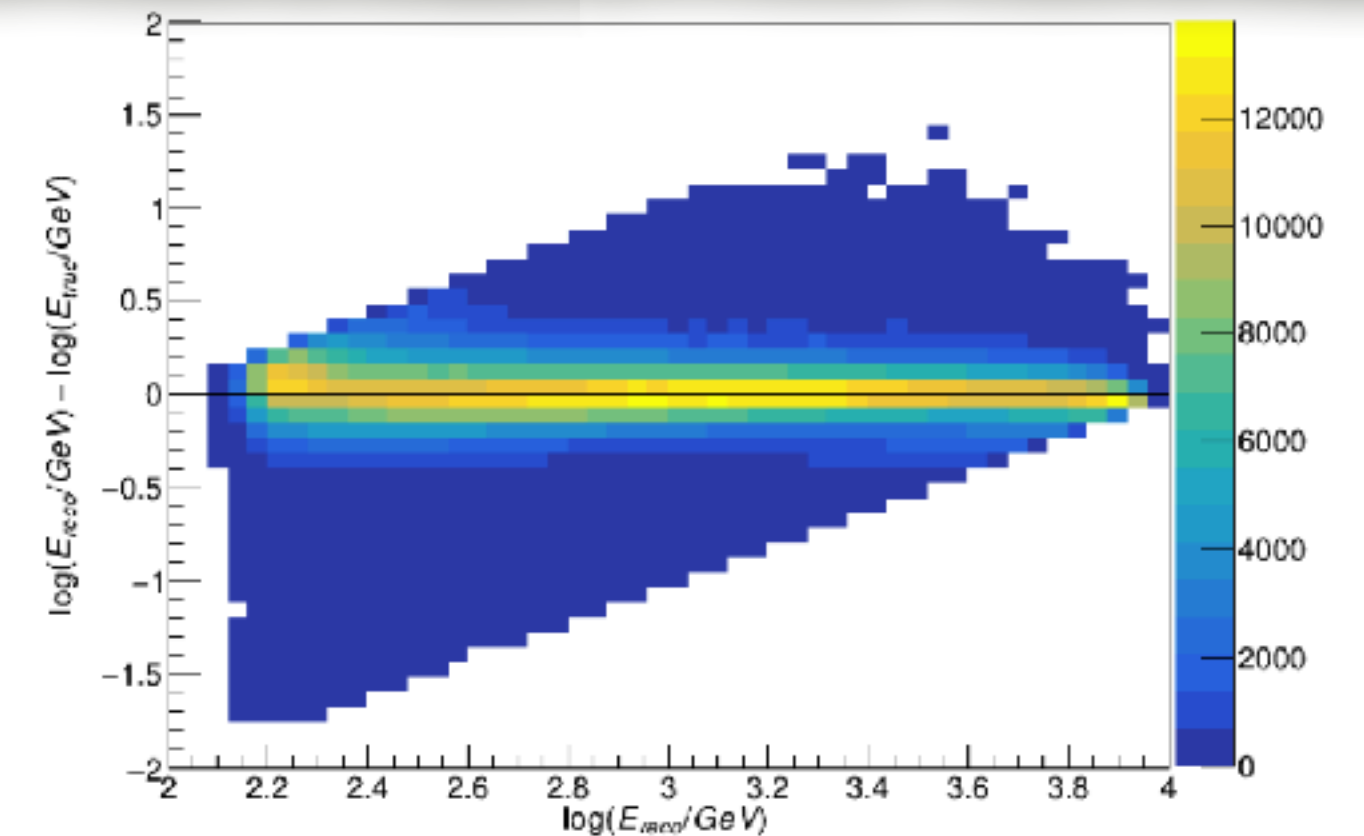
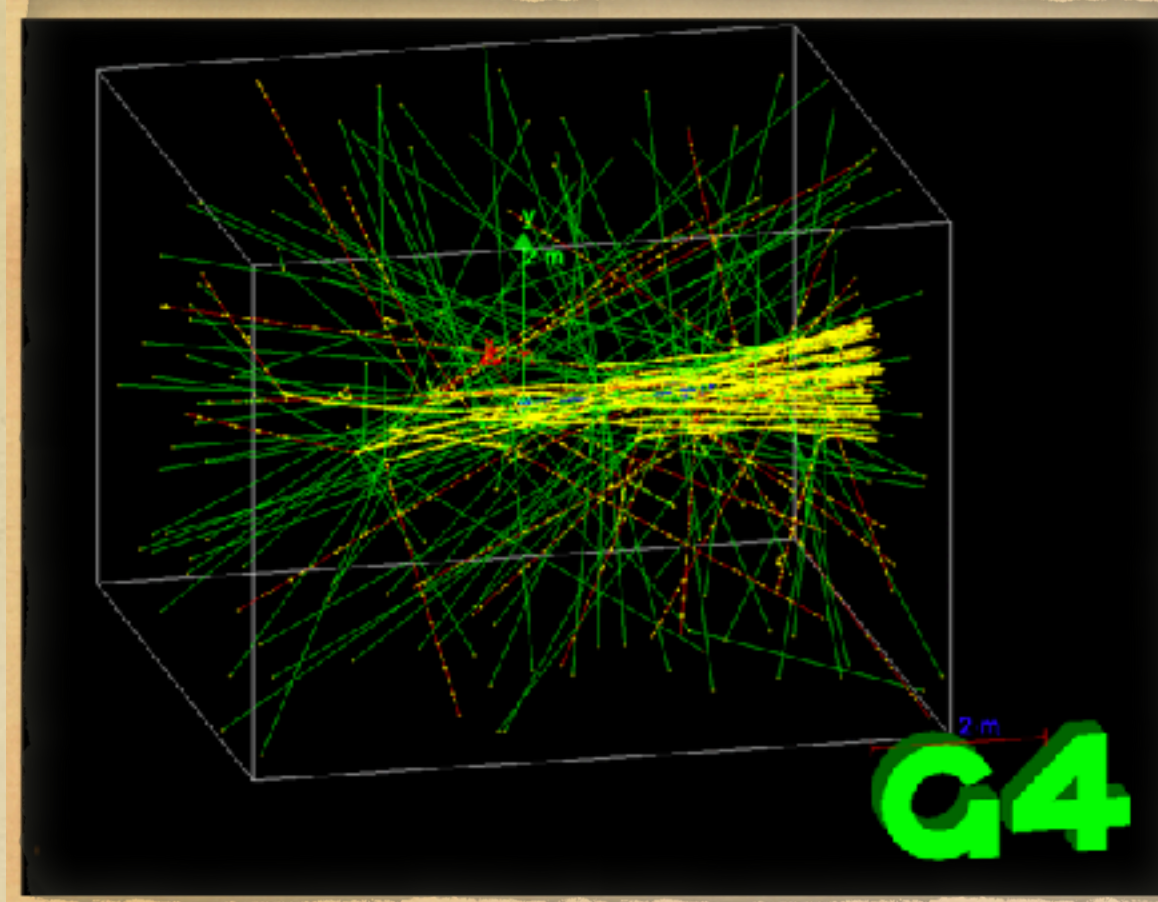


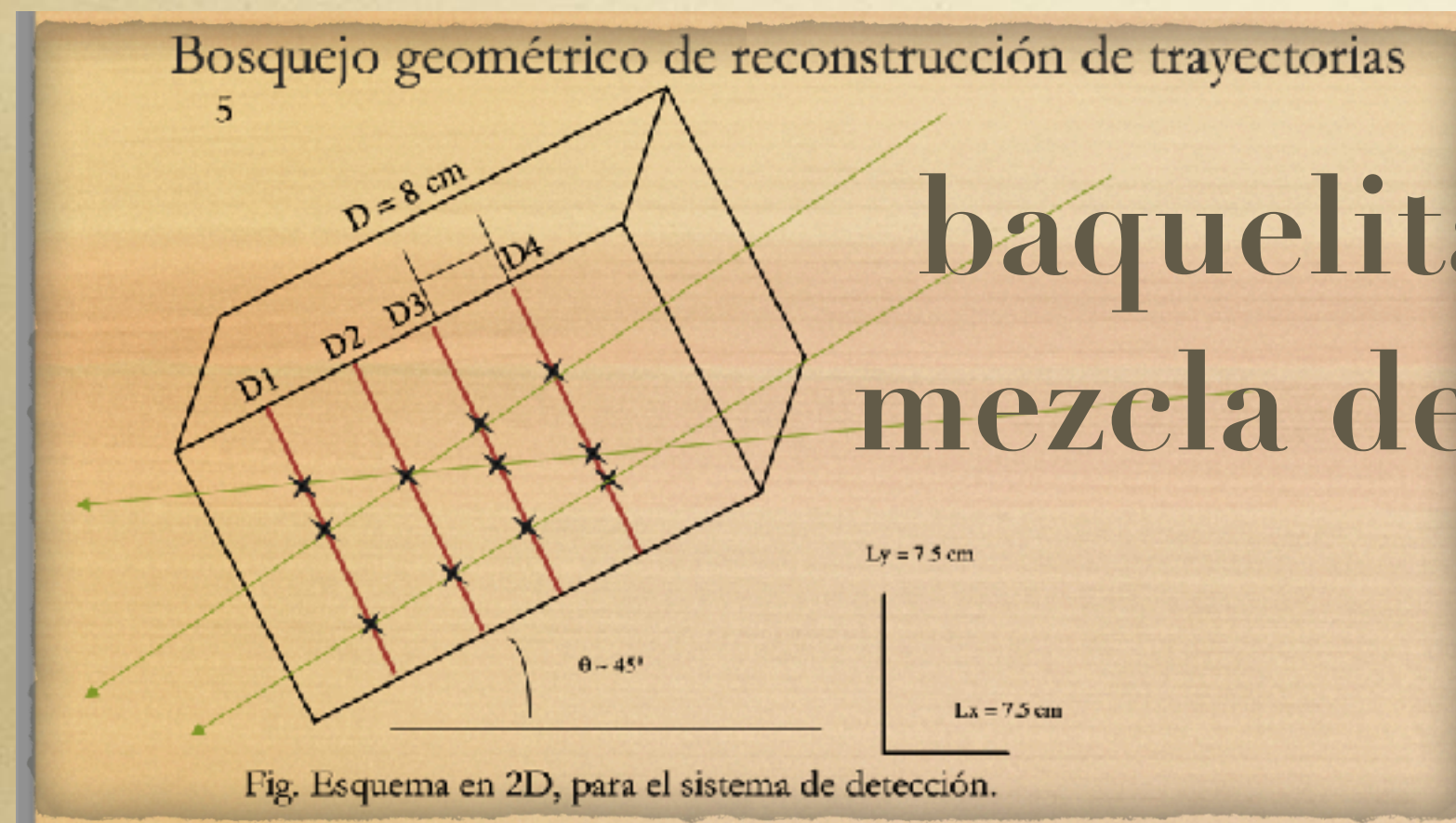
Figura 9: Diferencia entre energía verdadera y energía reconstruida.

Diapositiva 13 de Josue Cuzco

Resistive Plate Chambers detector



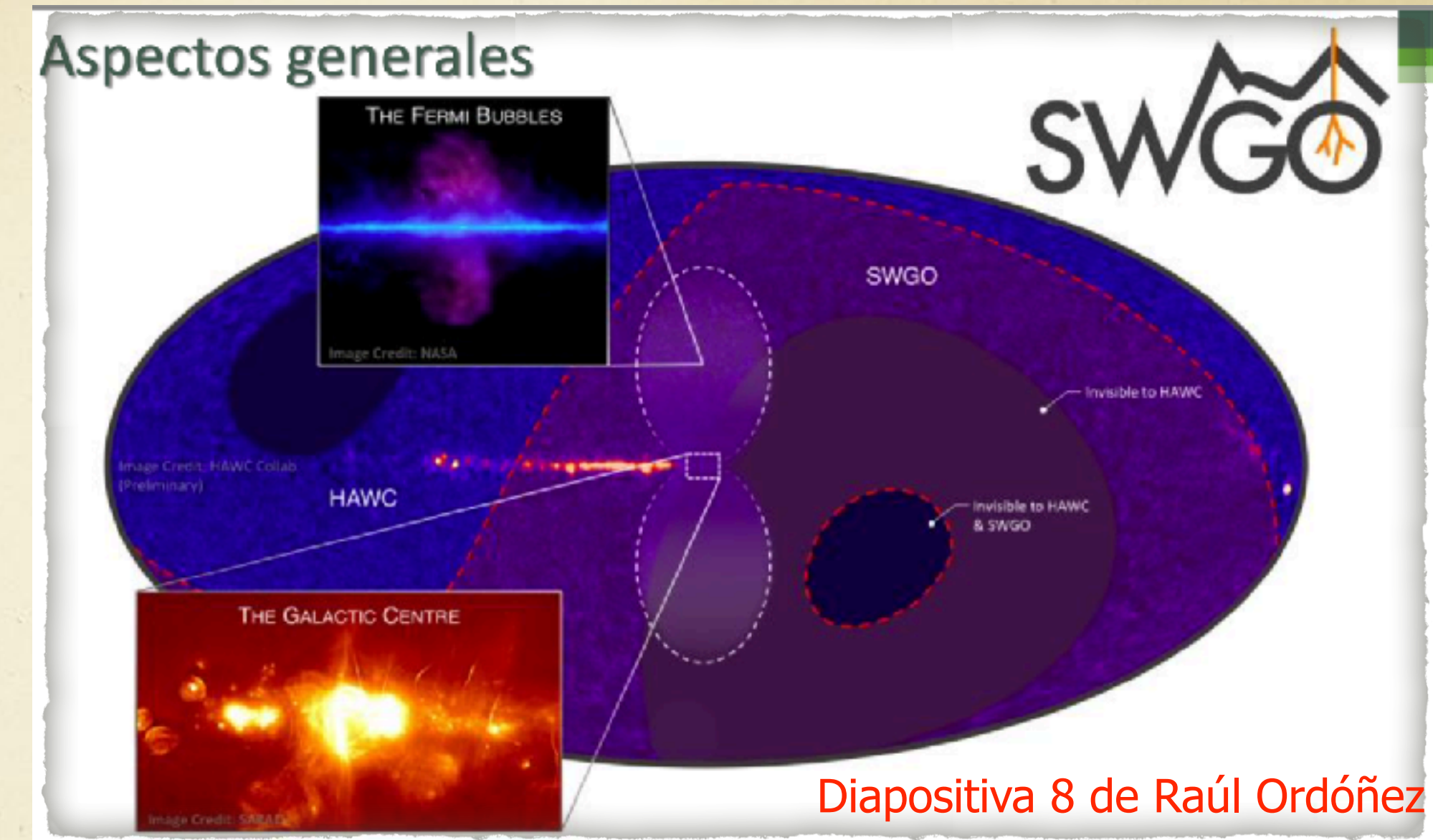
Diapositiva 7 de Jalil Villalobos



Diapositiva 5 de Jalil Villalobos

Usado para la radiografía y tomografía de muones

baquelita con mezcla de gases



Diapositiva 8 de Raúl Ordóñez

- $F_{r0} = F(r_0)$ Energía colectada en tierra en un radio menor a r_0 .
- S_{em} Energía total que llega a la tierra.
- $A_0 = F_{50} + GF_{50}^{\delta}$ Estimador de S_{em} .
- $f_{20} = \frac{F_{20}}{A_0}$

Diapositiva 13 de Raúl Ordóñez

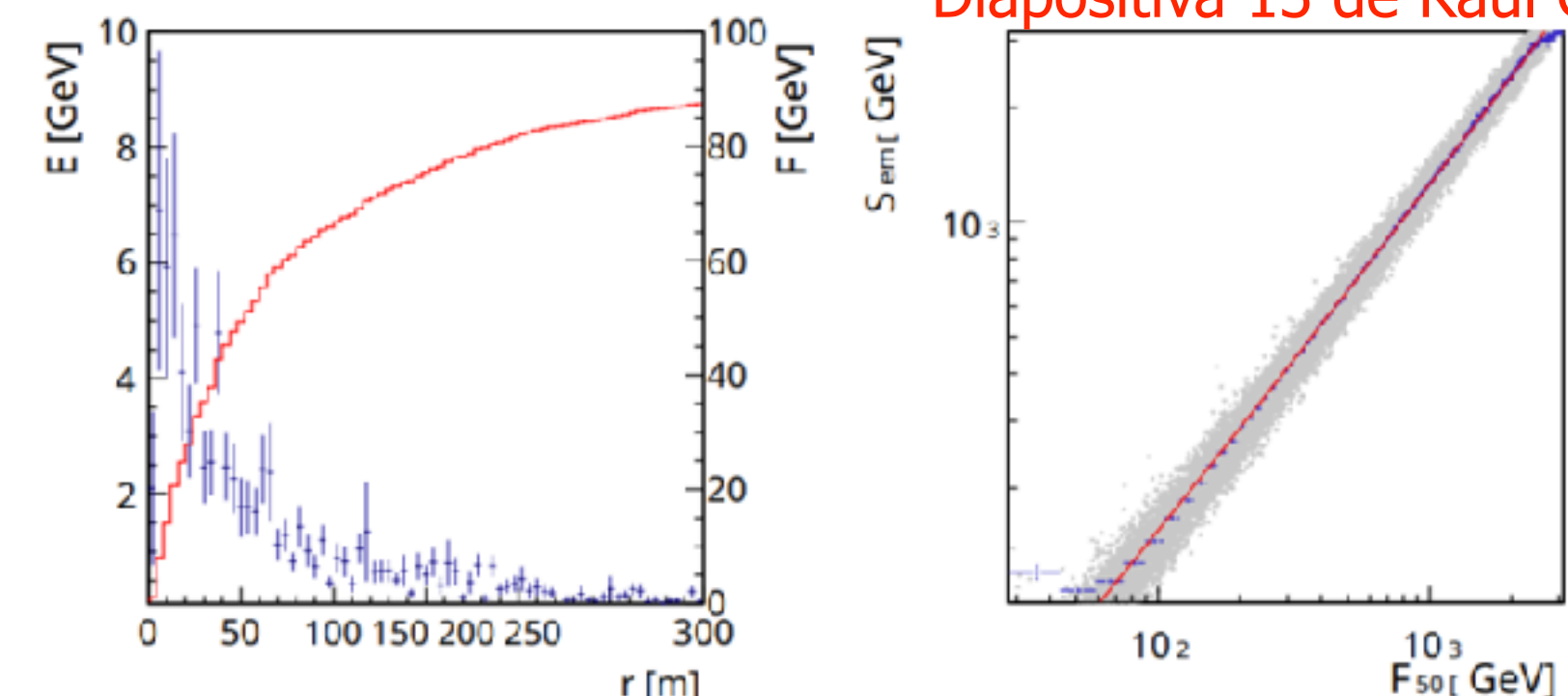
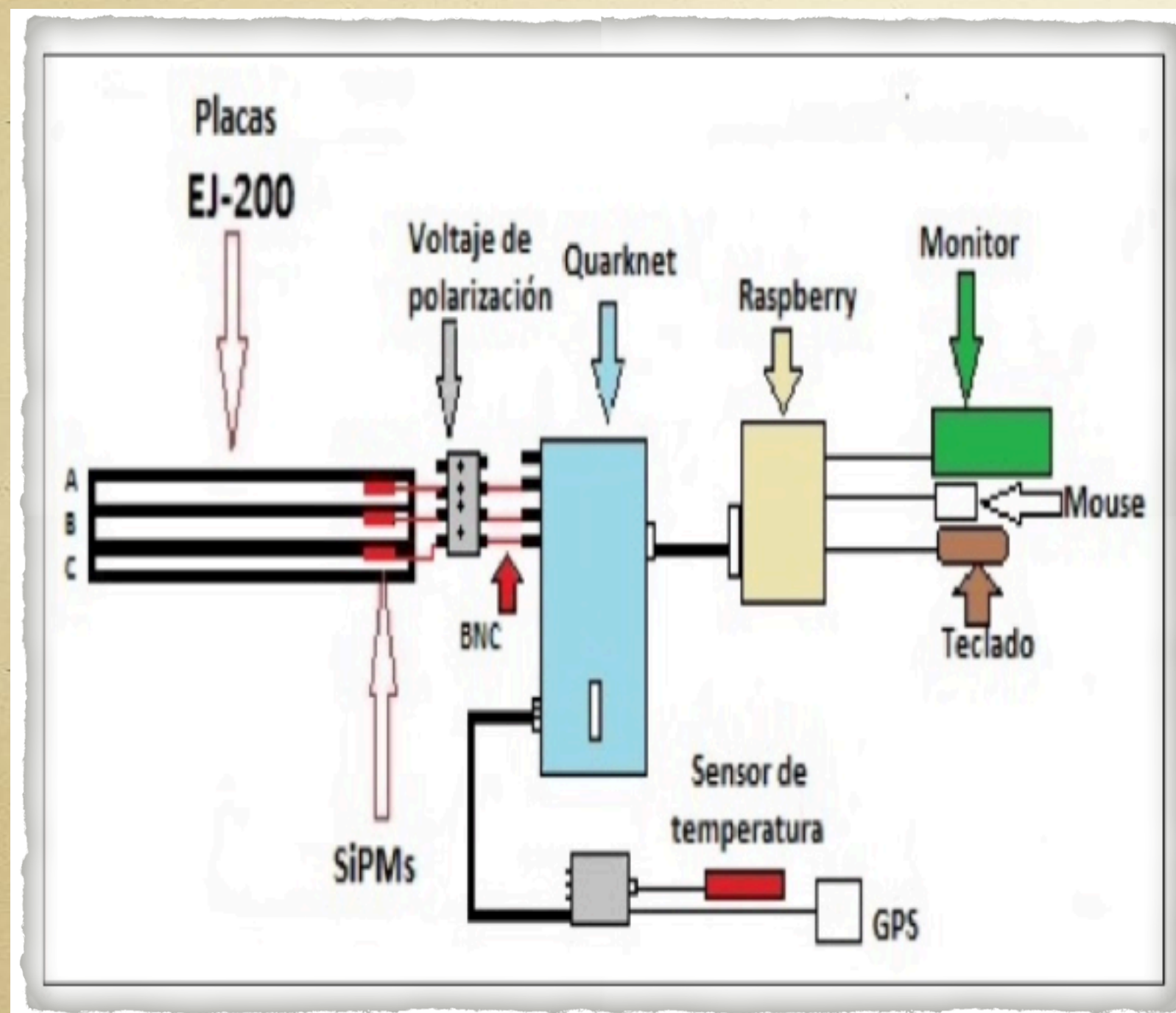


Figura 15: A la izquierda, la distribución de energía en el suelo para un evento con energía inicial = 1165.9 GeV, energía en Tierra = 96.5 GeV. A la derecha, la correlación entre la energía depositada en el suelo con F50.

Detector Escaramujo



Diapositiva 7 de Victor Manuel

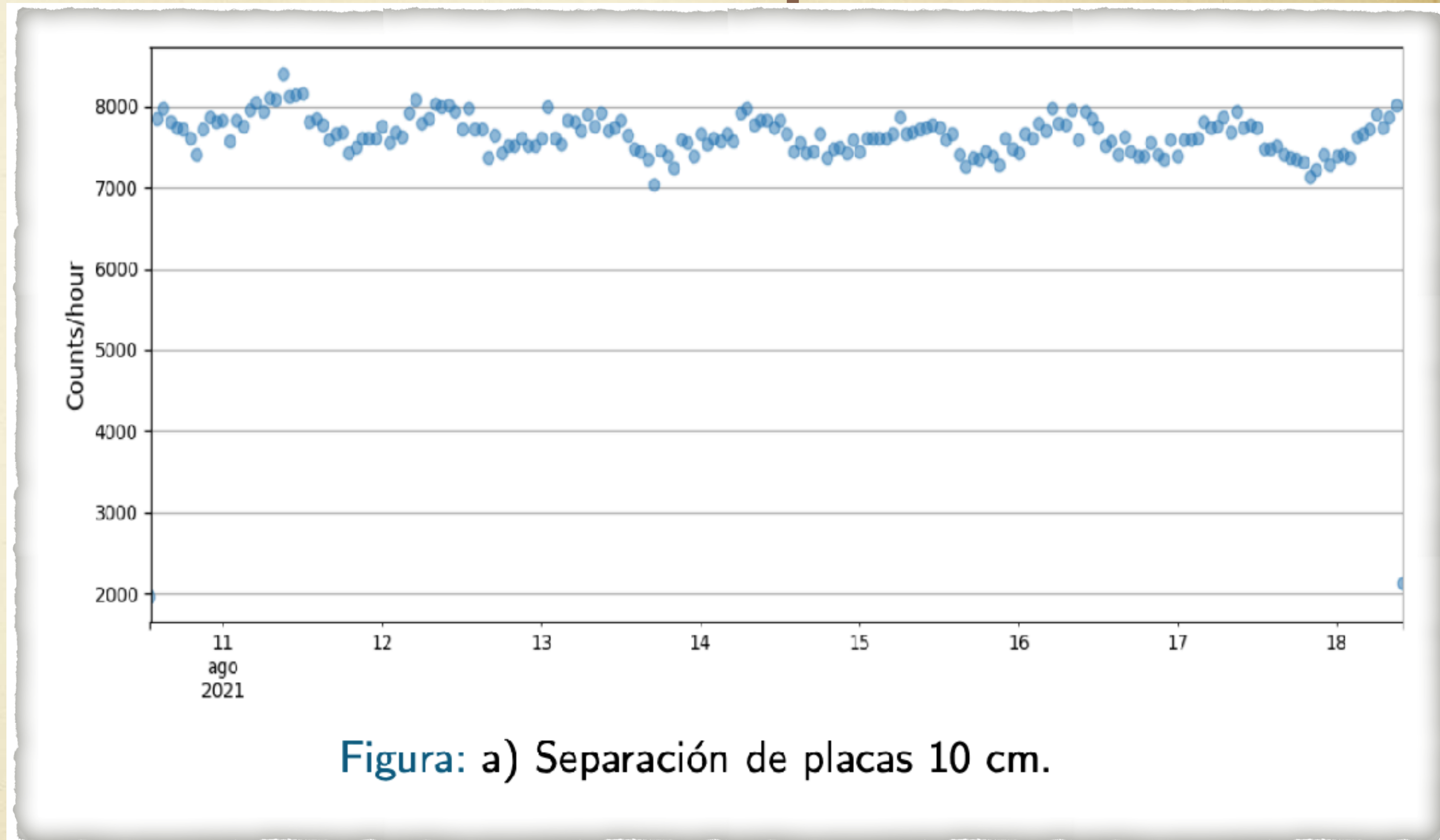


Figura: a) Separación de placas 10 cm.

Diapositiva 19 de Victor Manuel

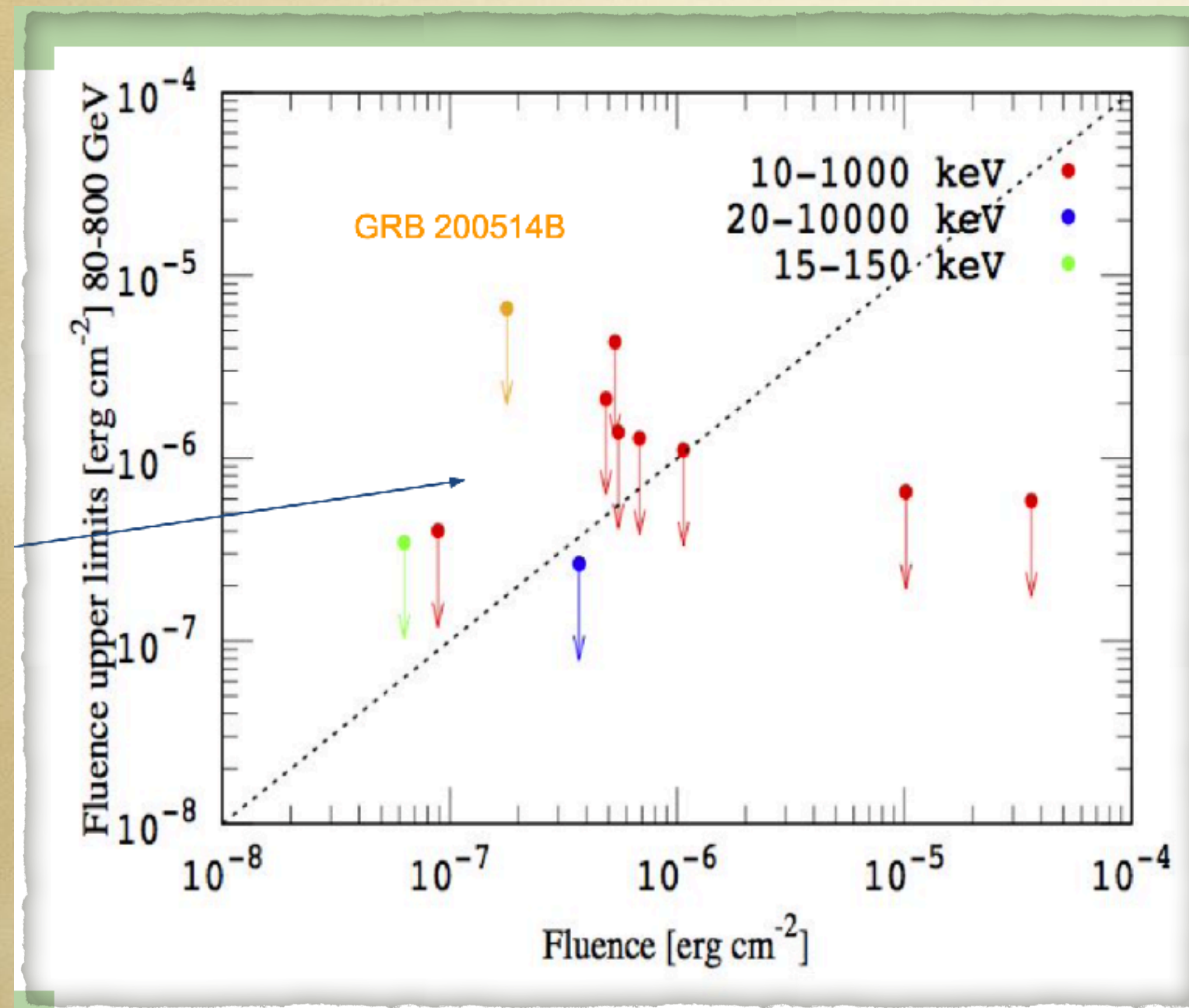
Detector de muones

Mediciones con diferente separación
entre placas

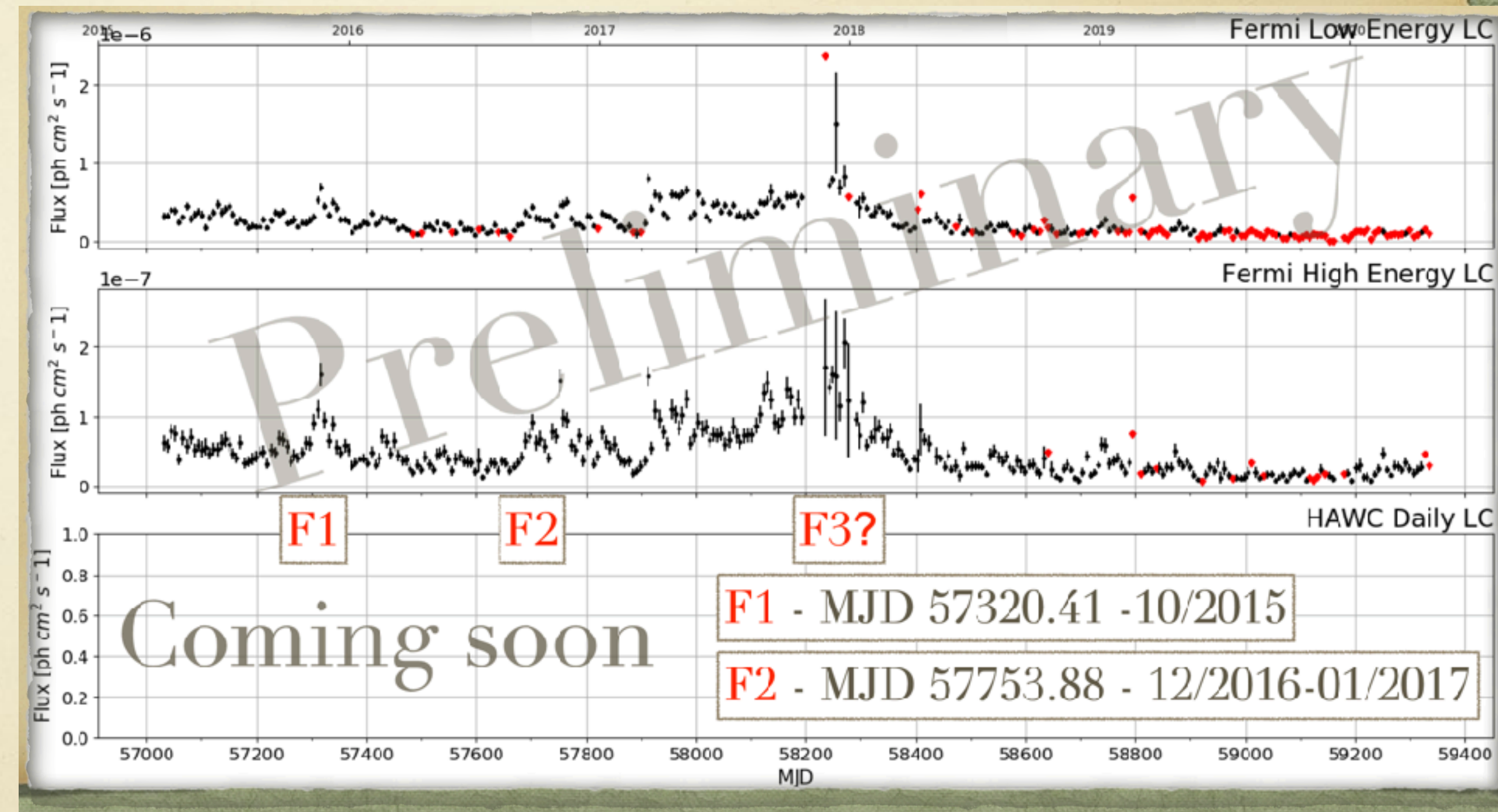
HAWC

Destellos de rayos gamma (GRB)

Radio galaxias



Diapositiva 9 de Junior Perez



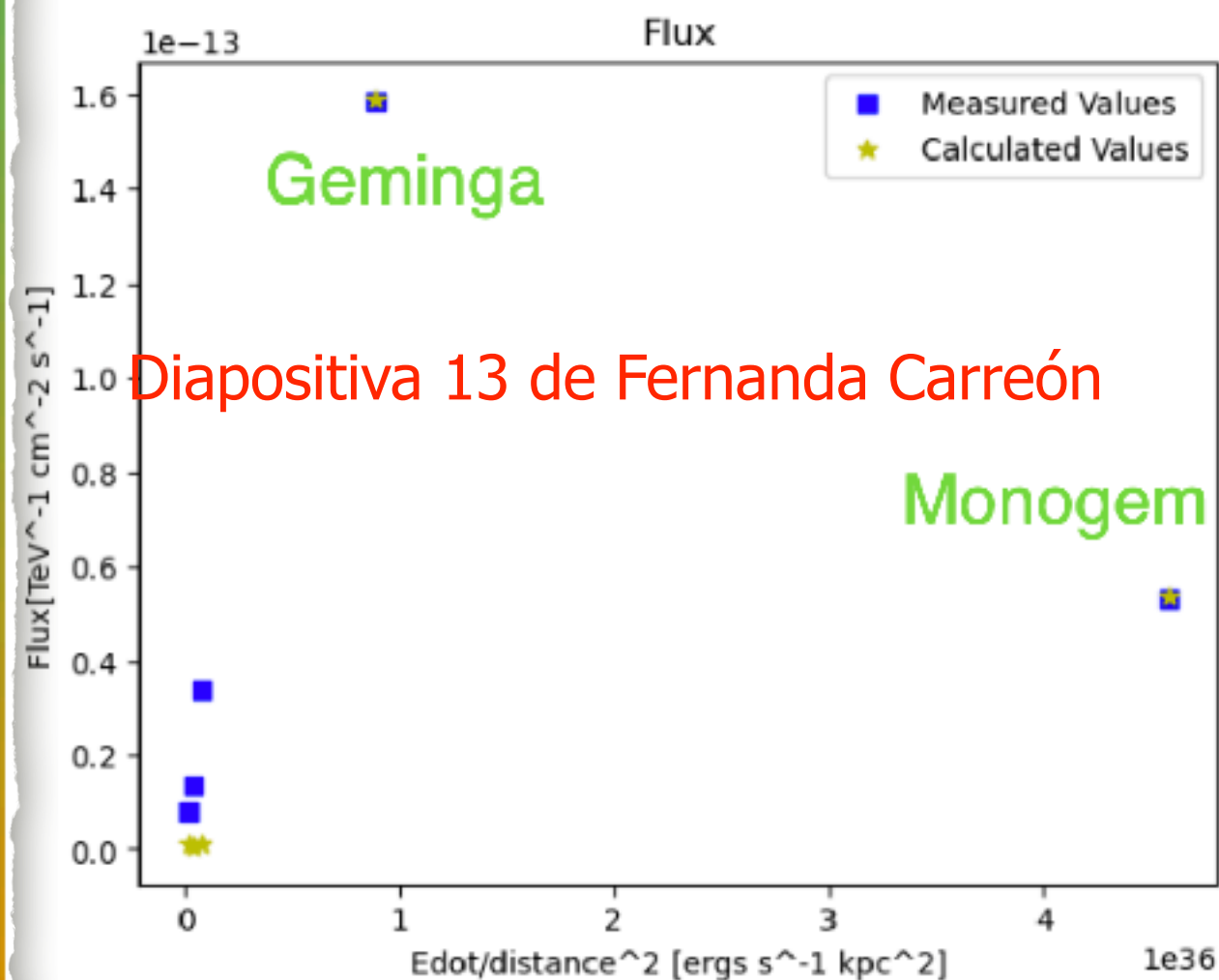
Diapositiva 12 de Tomás Capistrán

HAWC

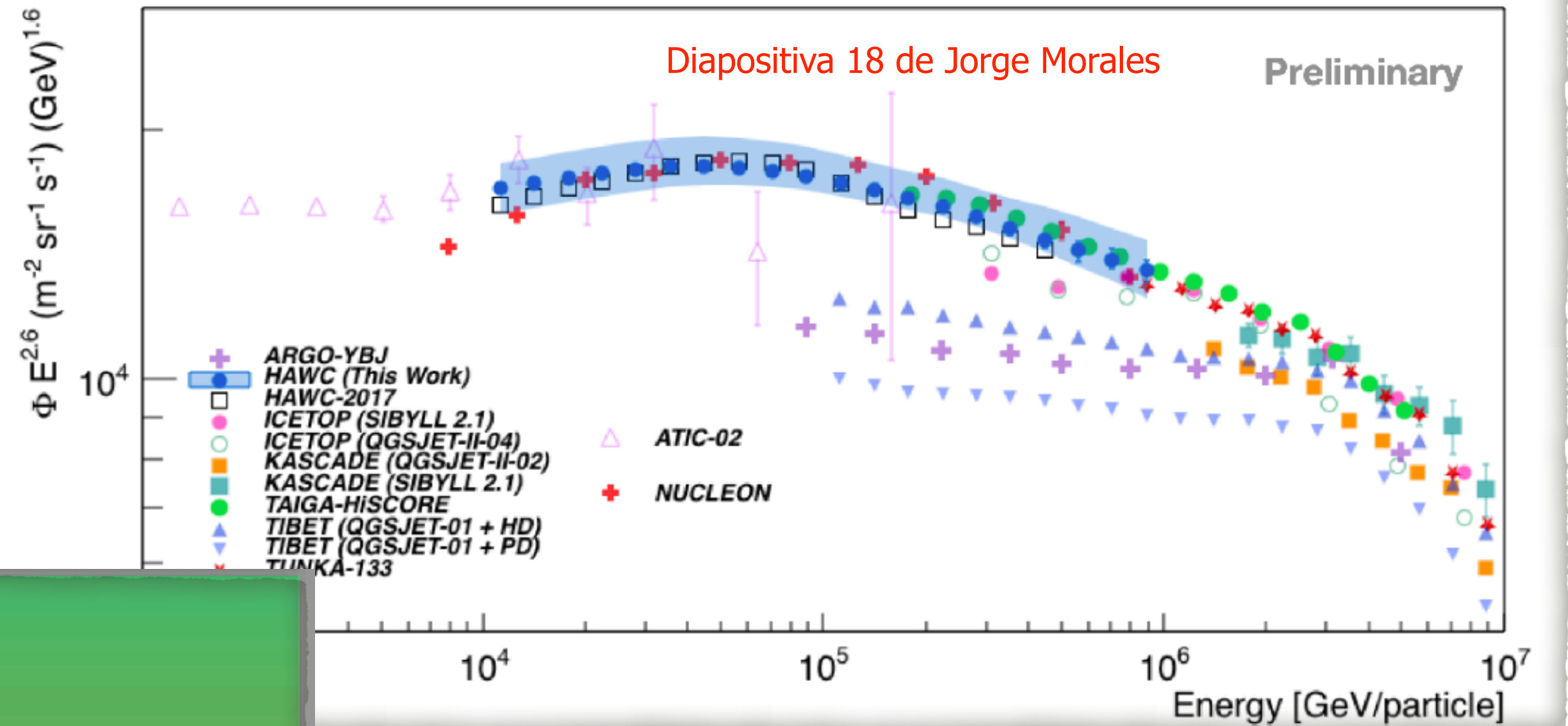
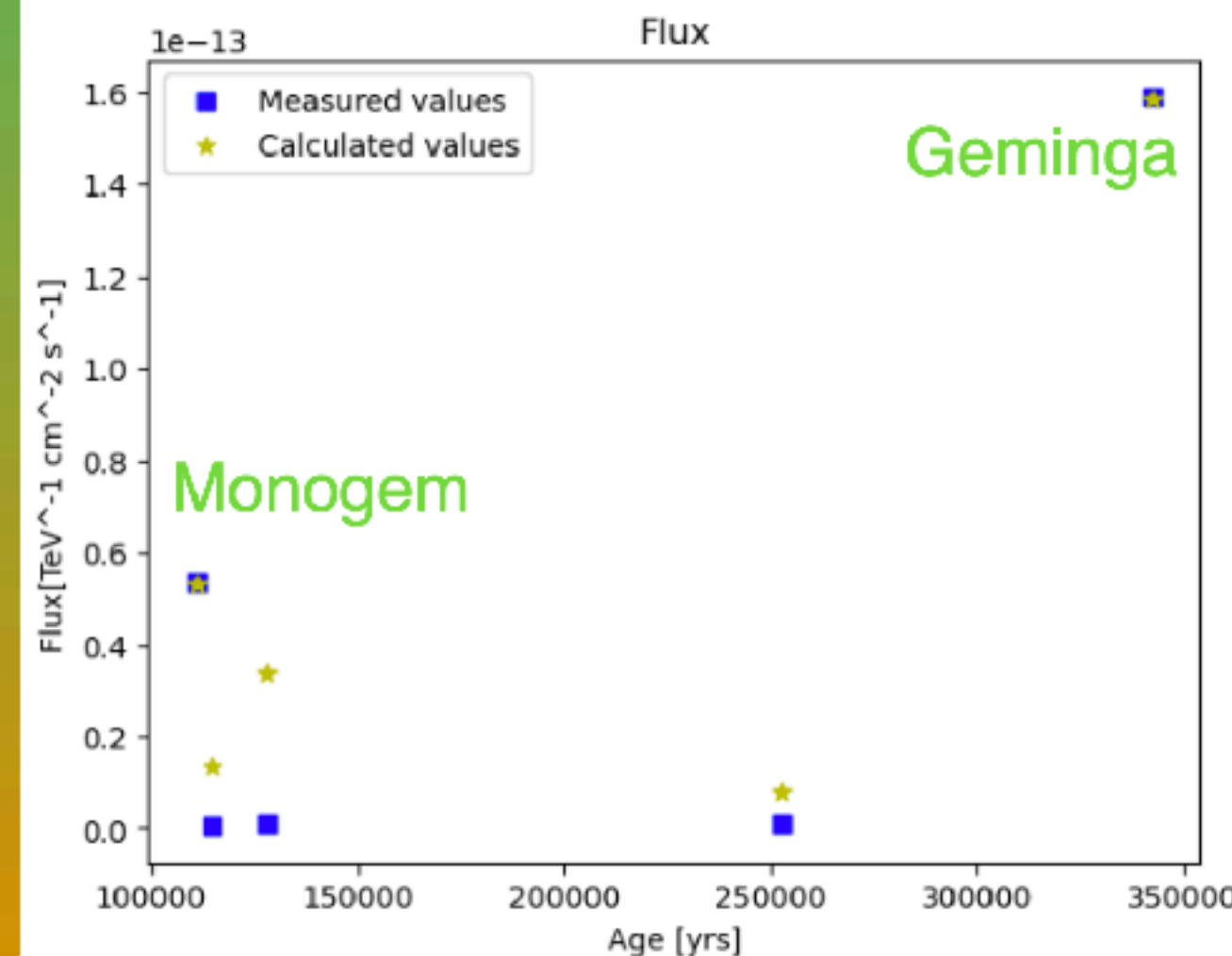
TeV Halo

$$F_{Halo} = F_{Geminga} \times \frac{\dot{E}_{Geminga}}{\dot{E}_{psr}} \times \frac{d_{Geminga}^2}{d_{psr}^2} \times \exp \left(B \times \left(1 - \frac{Age_{psr}}{Age_{Geminga}} \right) \right)$$

• B=-4.035

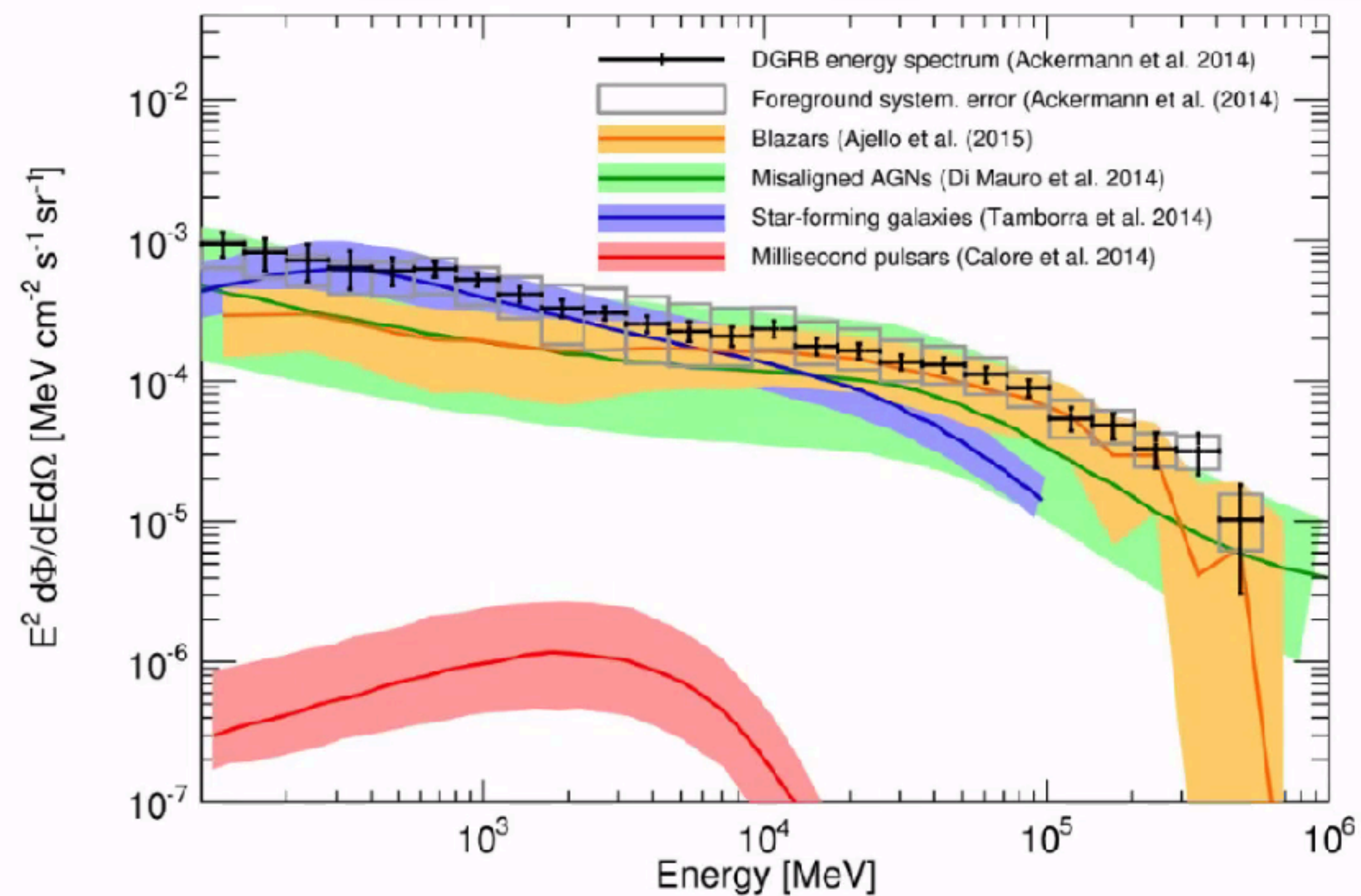


Diapositiva 13 de Fernanda Carreón



HAWC

Difuso Extragaláctico de rayos gamma



(Fornasa & Sánchez-Conde 2015)

Diapositiva 3 de Daniel Avila

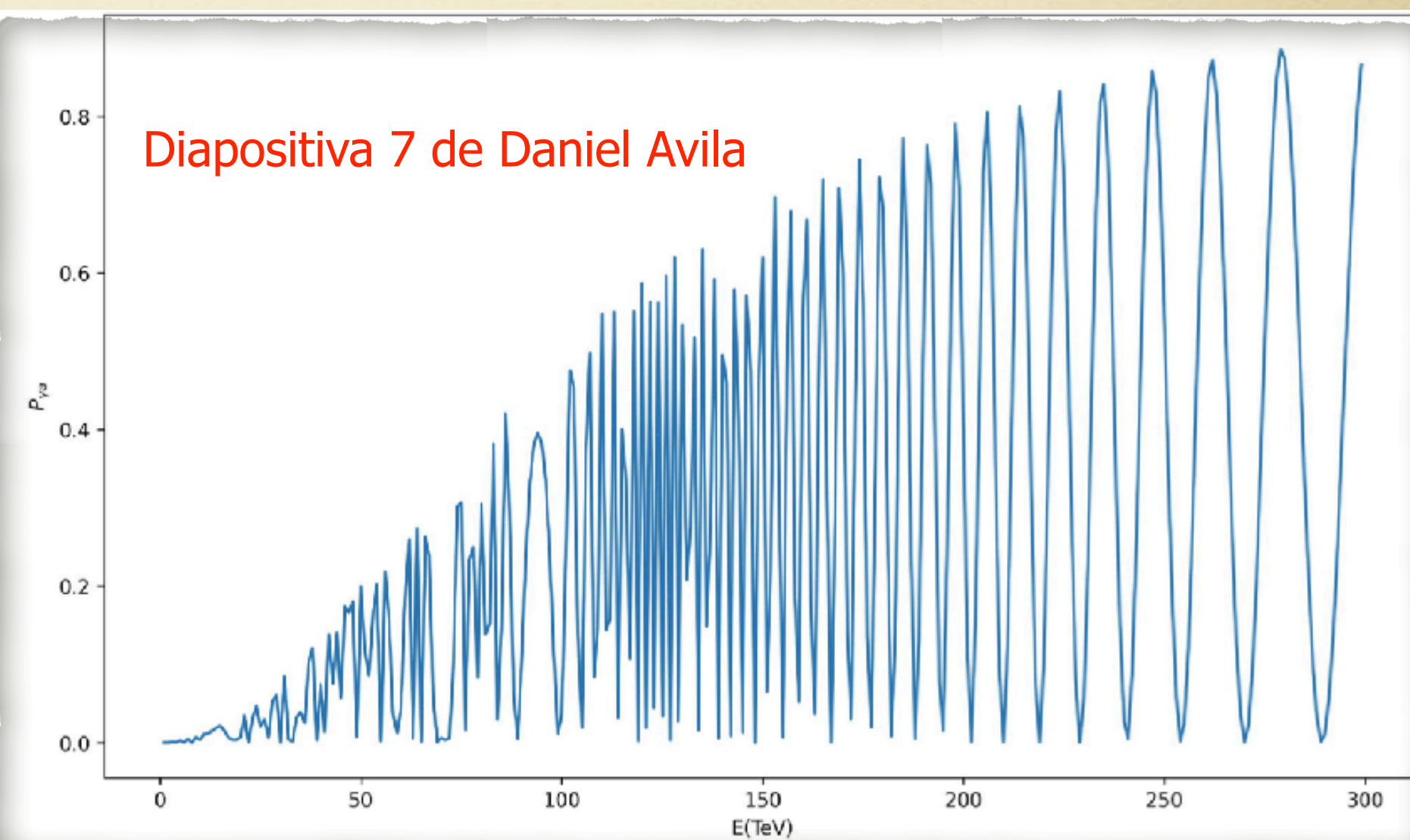
Partículas tipo avión (ALP)



Diapositiva 6 de Daniel Avila

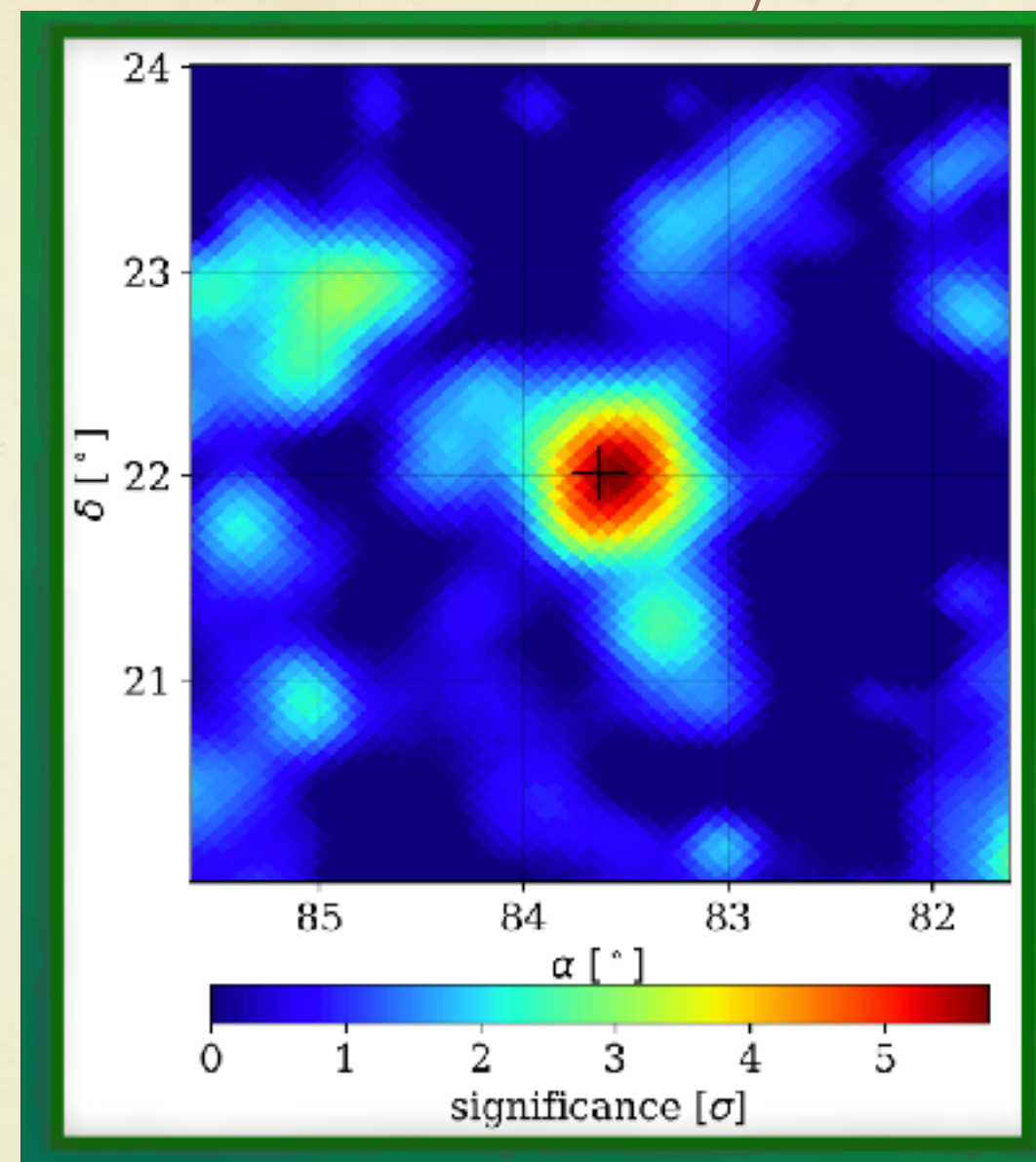
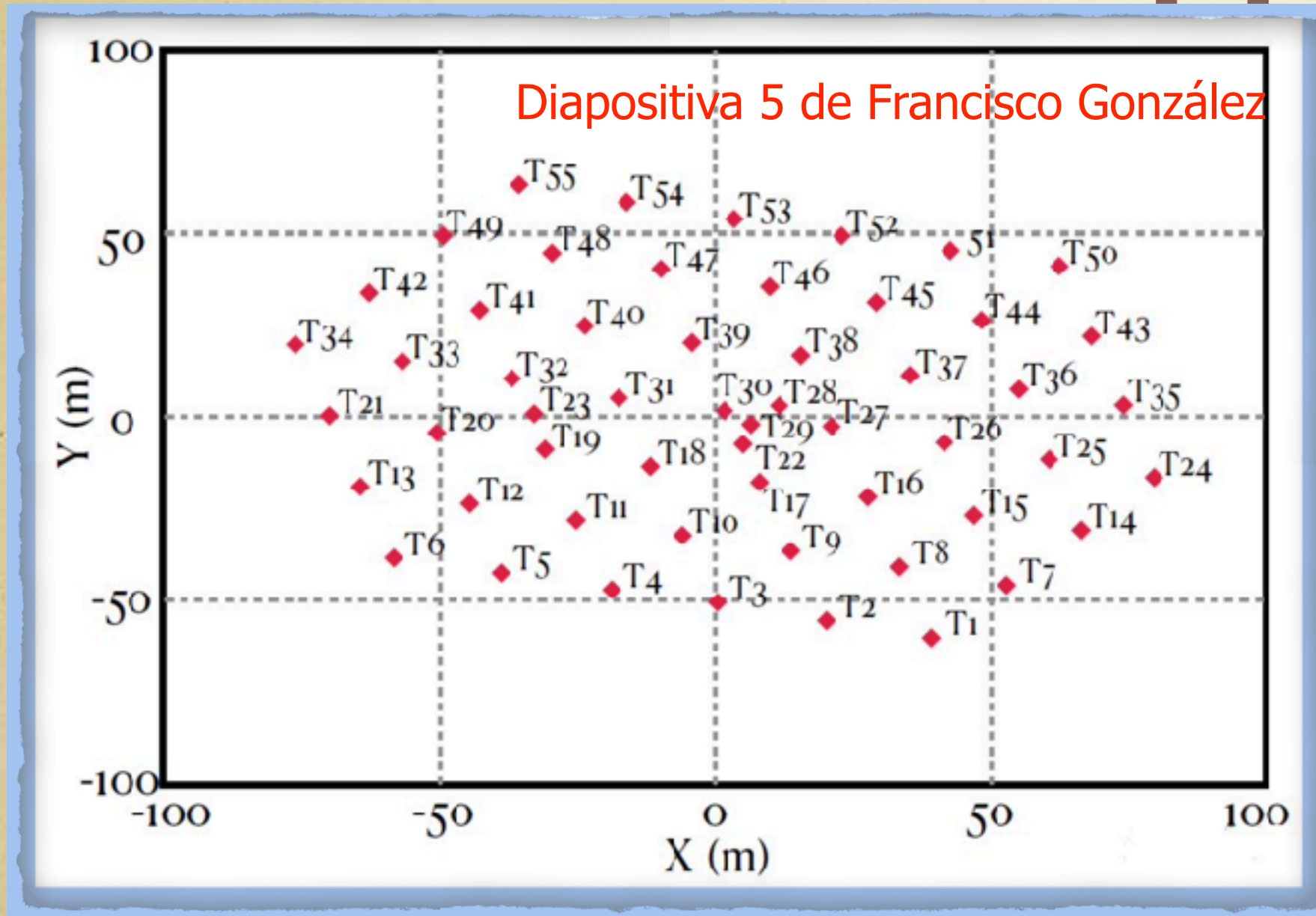
$$N_0 = 1.34 \pm 0.14^{stat} \pm 0.27^{sys} \times 10^{-13} \text{ TeV cm}^{-2} \text{ s}^{-1},$$
$$\Gamma = 2.39 \pm 0.14^{stat} \pm 0.25^{sys}$$

Diapositiva 7 de Daniel Avila

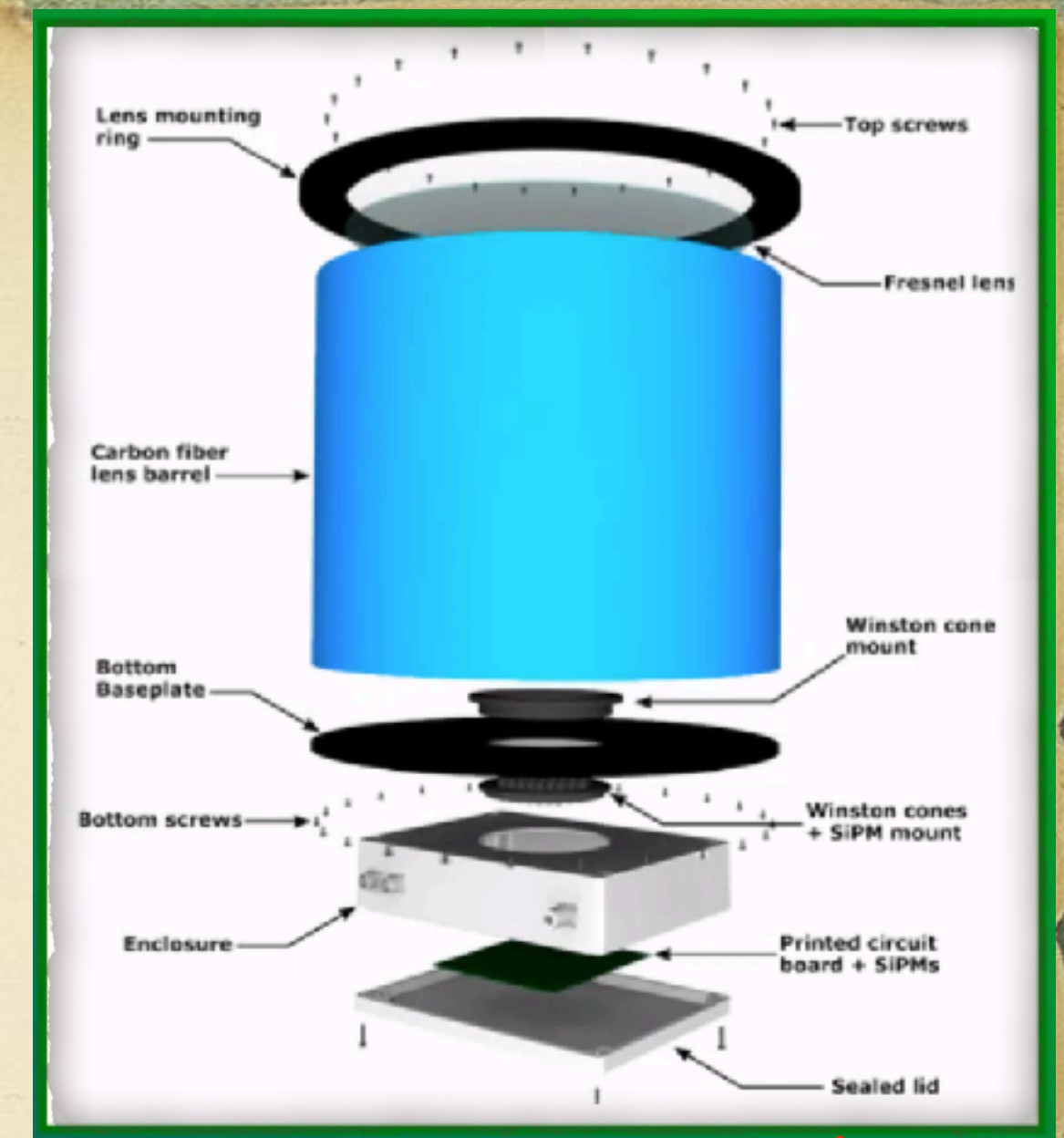


NGC 253

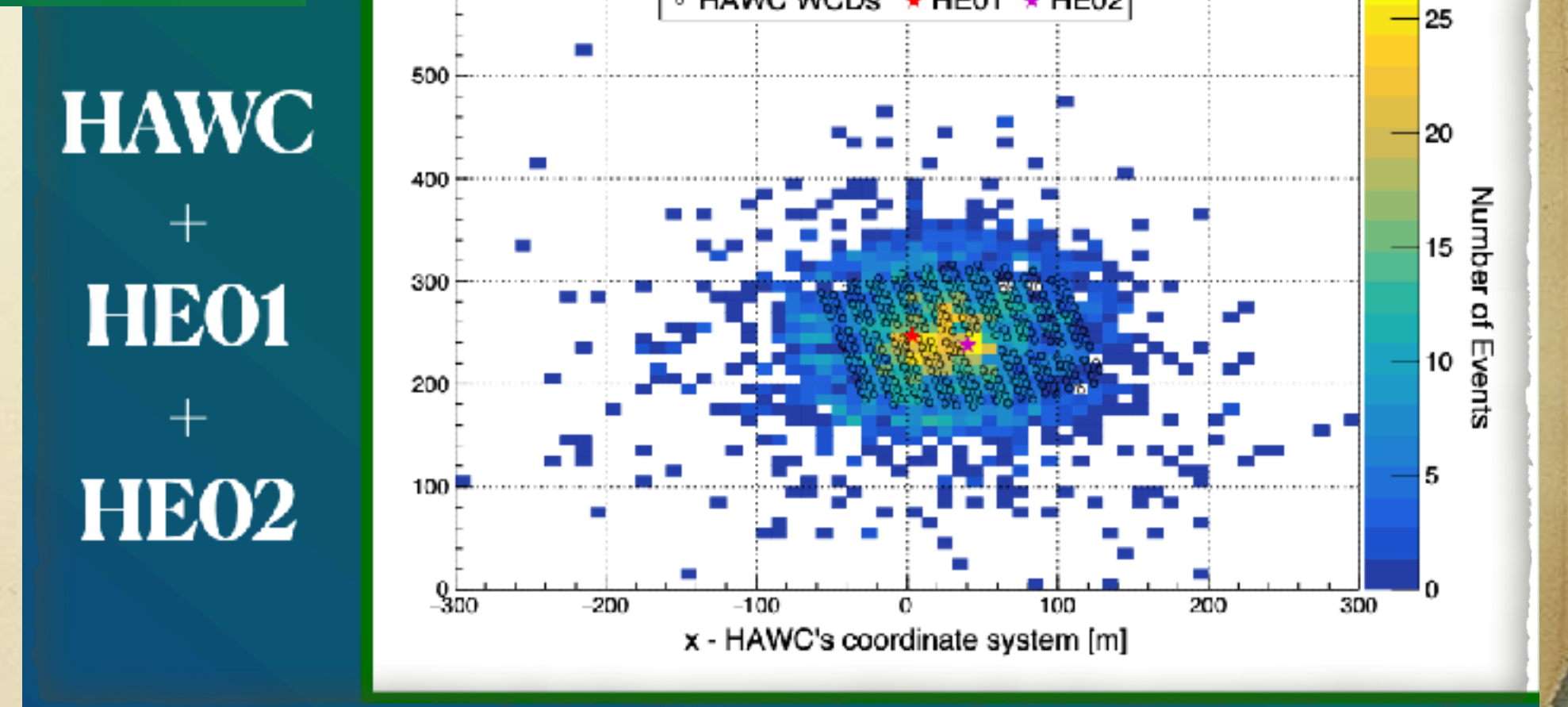
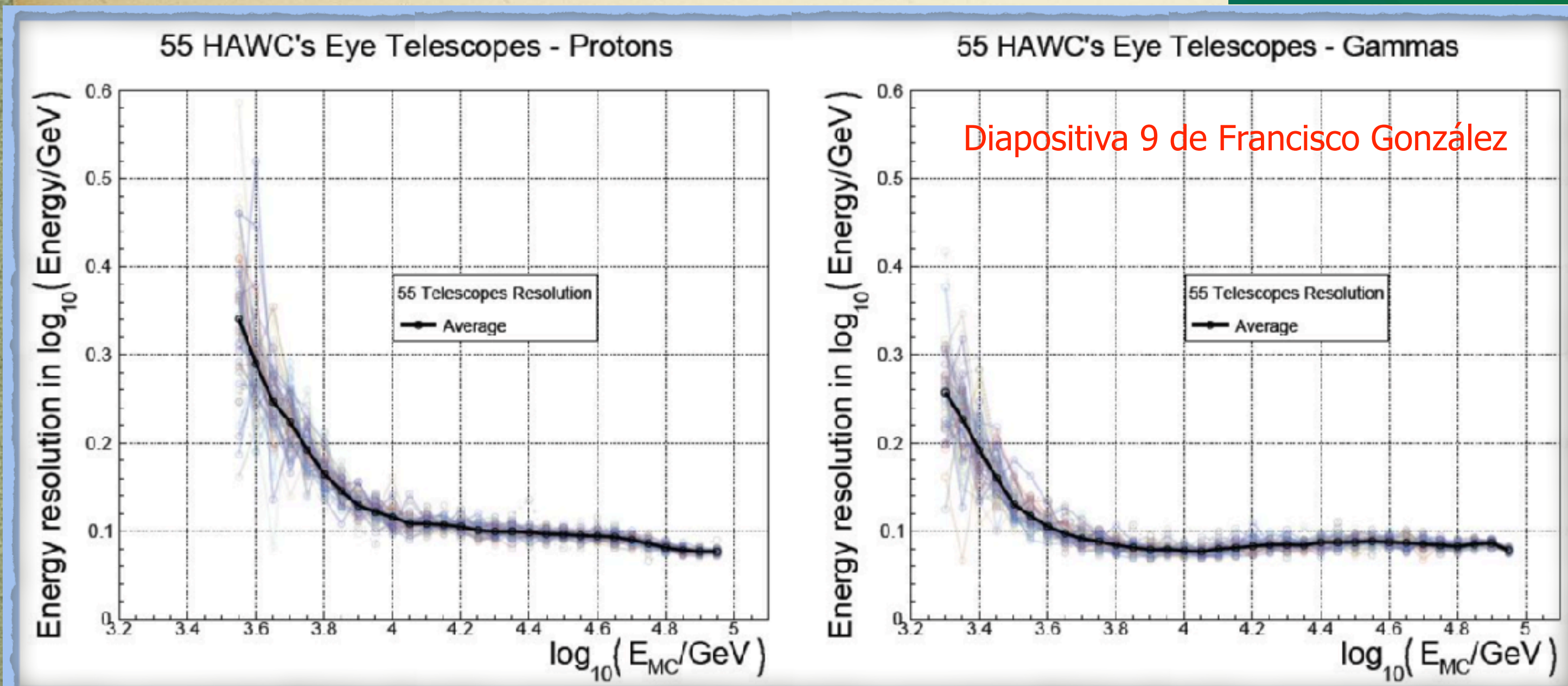
HAWC-Eye



Diapositiva 9 de José Serna

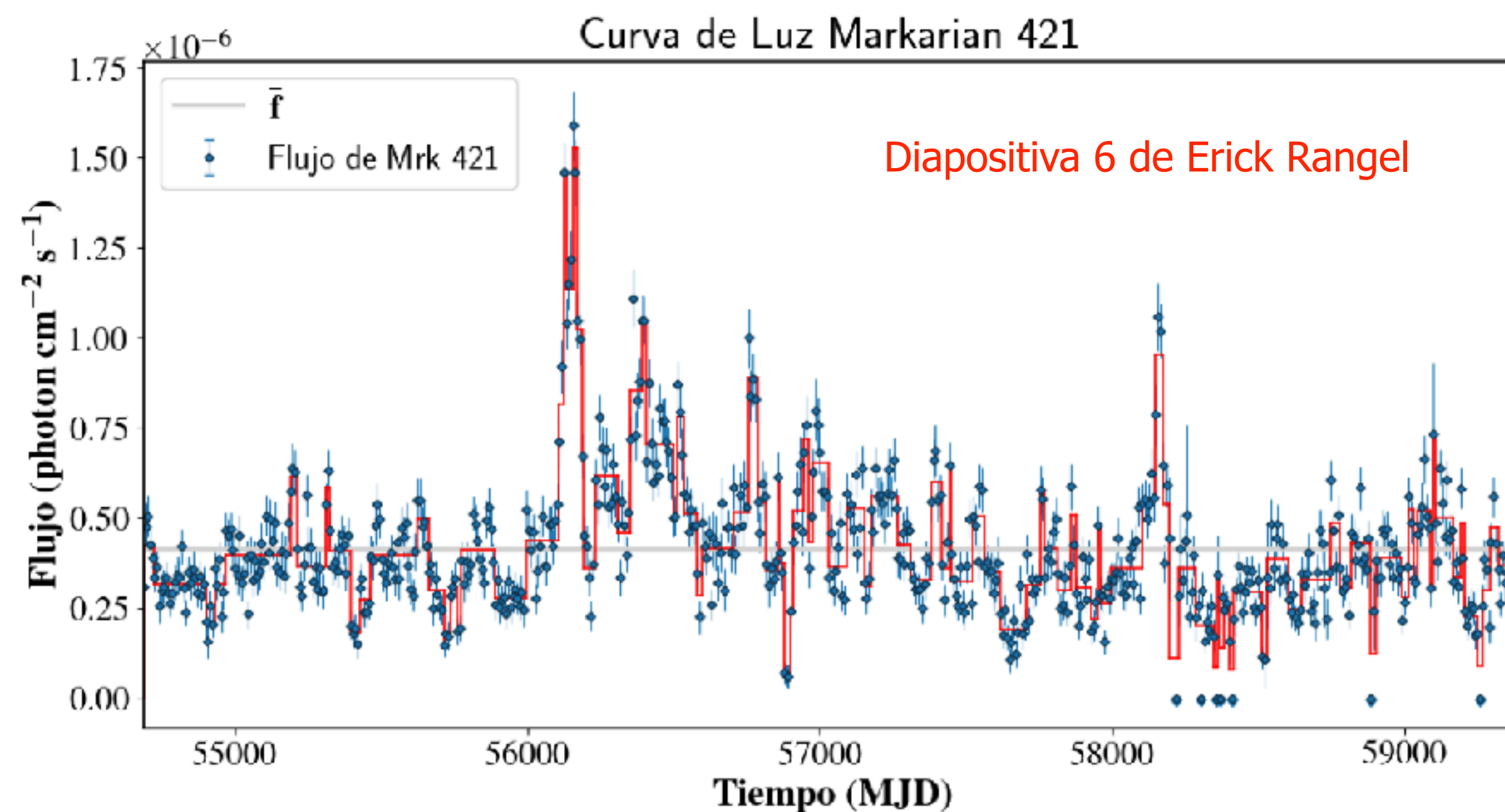


Diapositiva 7 de José Serna



Diapositiva 12 de José Serna

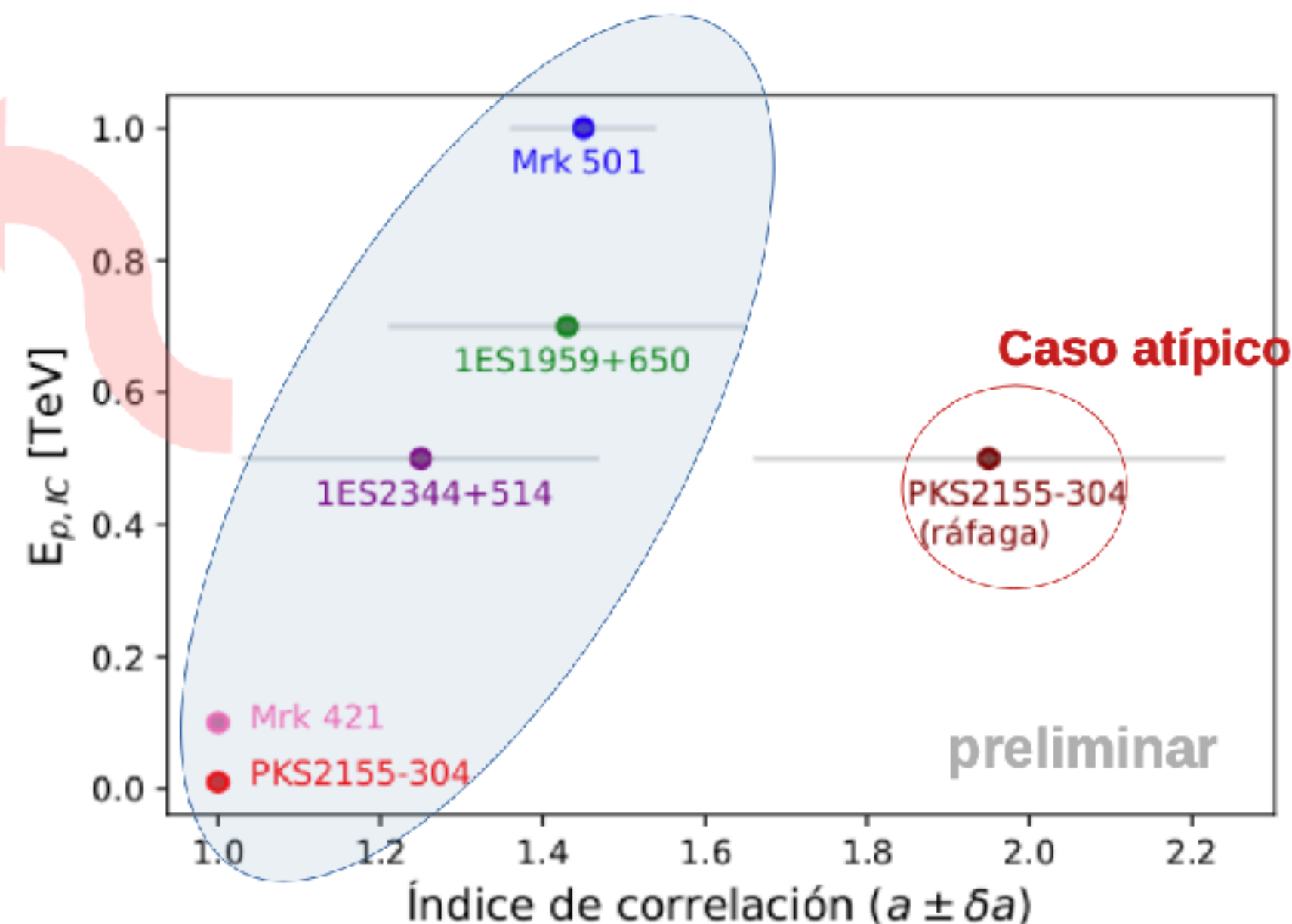
Fermi-LAT y +



Curva de luz de Markarian 421 con intervalos de tiempo de 1 semana (puntos azules) durante 13 años. Las líneas rojas representan los bloques bayesianos, la línea gris es el flujo promedio.

¡Correlación!

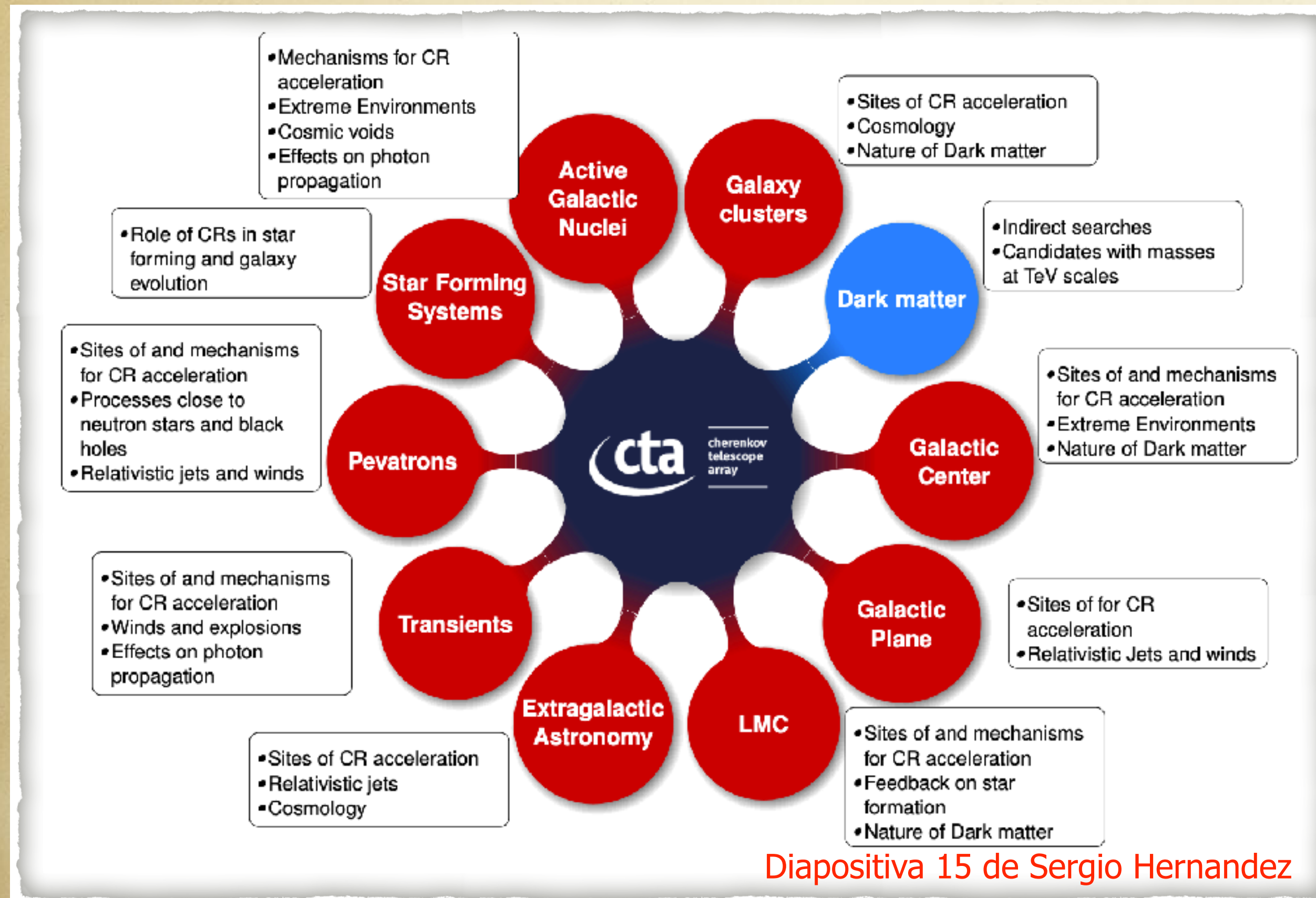
Relación entre la energía pico TeV y el índice de la correlación



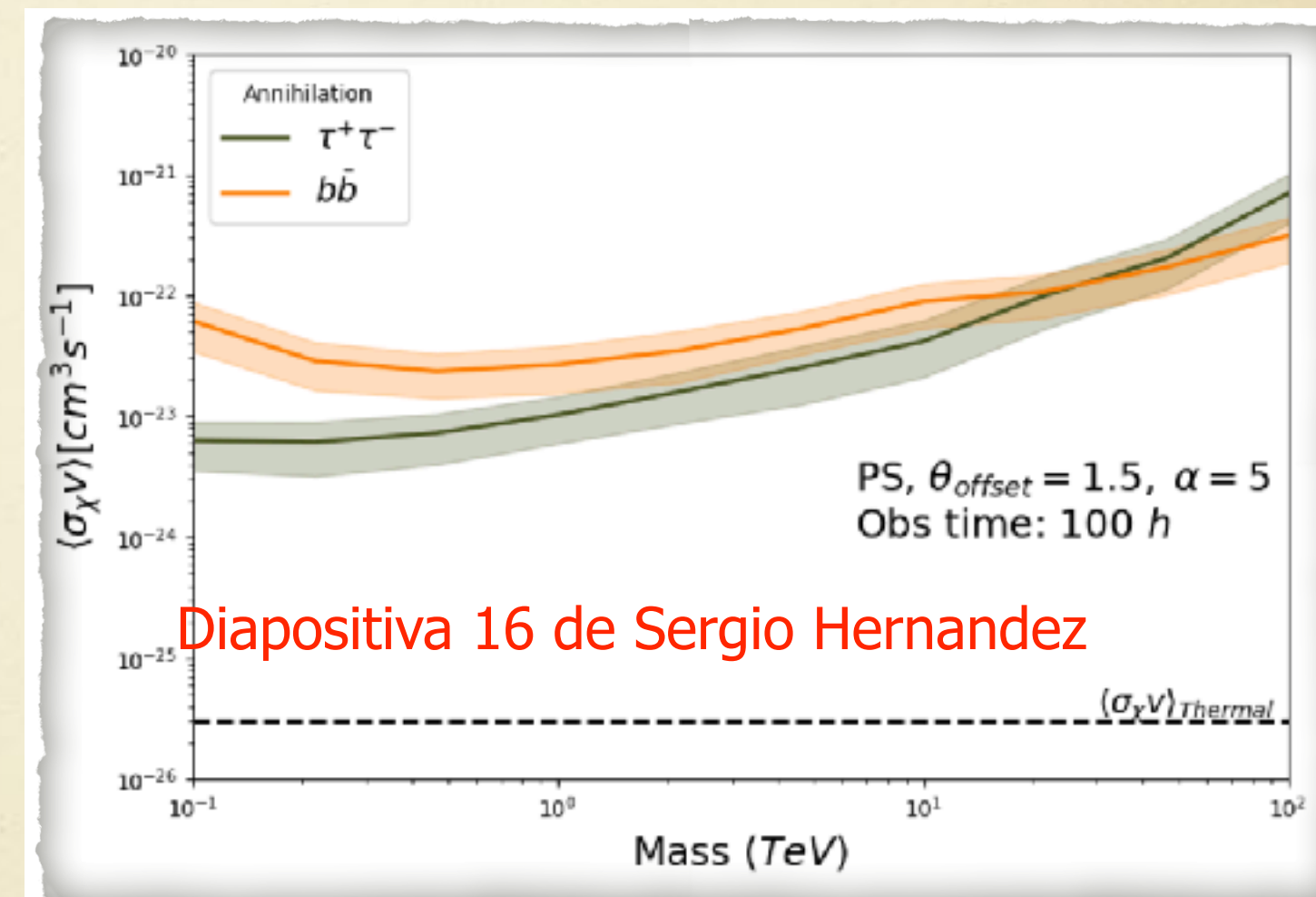
Diapositiva 17 de Mabel Oscorio

CTA & Materia Oscura

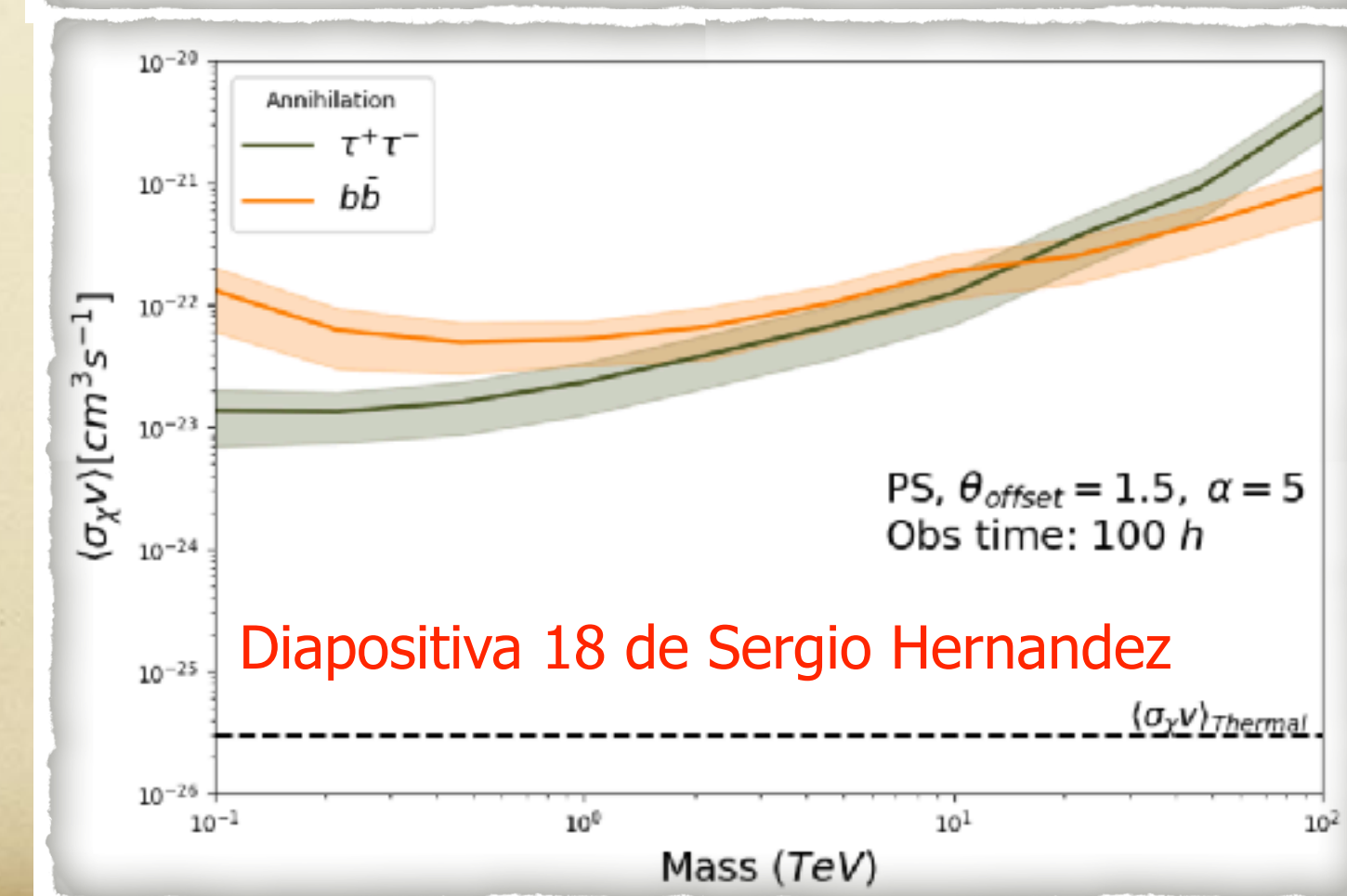
Weakly Interactive Massive Particles (WIMPs)



Diapositiva 15 de Sergio Hernandez



Diapositiva 16 de Sergio Hernandez



Diapositiva 18 de Sergio Hernandez

Fornax

Ophiuchus

Gracias