

# Fulguraciones solares

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**NACIONAL**  
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FACULTAD DE CIENCIAS

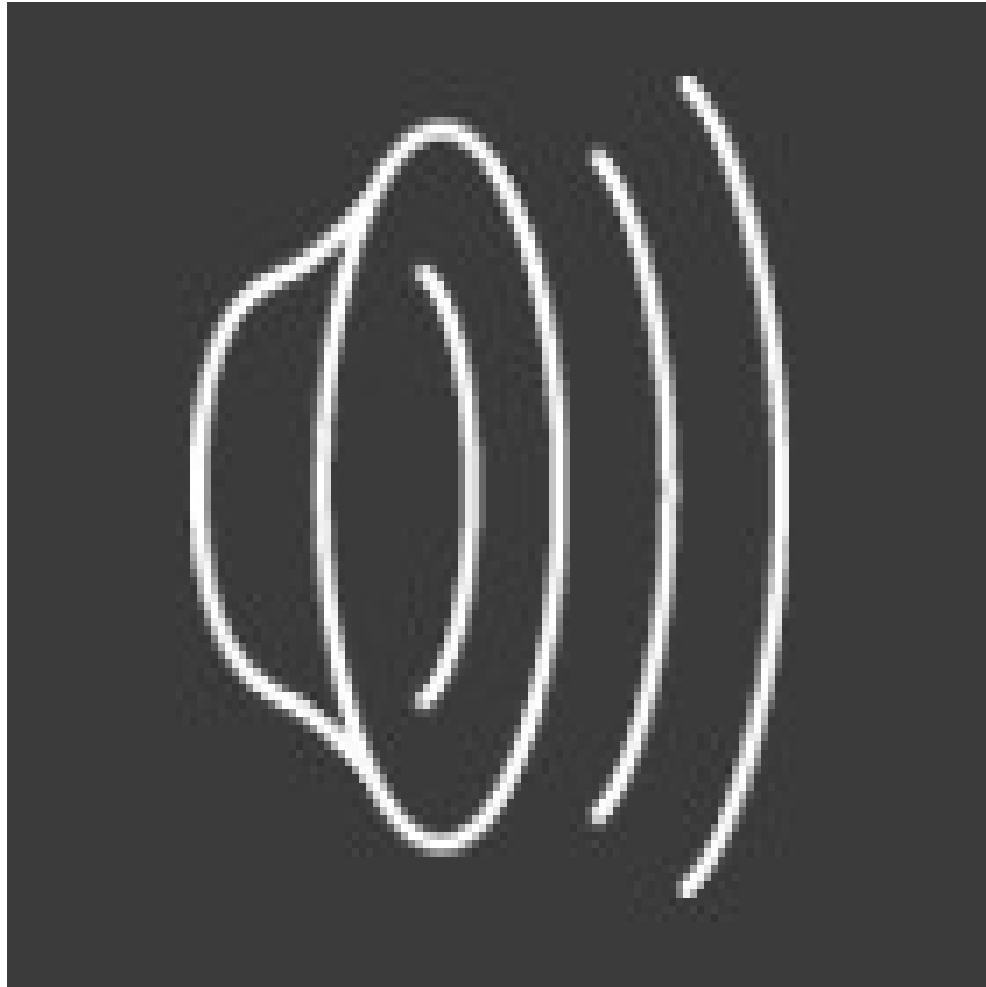
Observatorio Astronómico Nacional



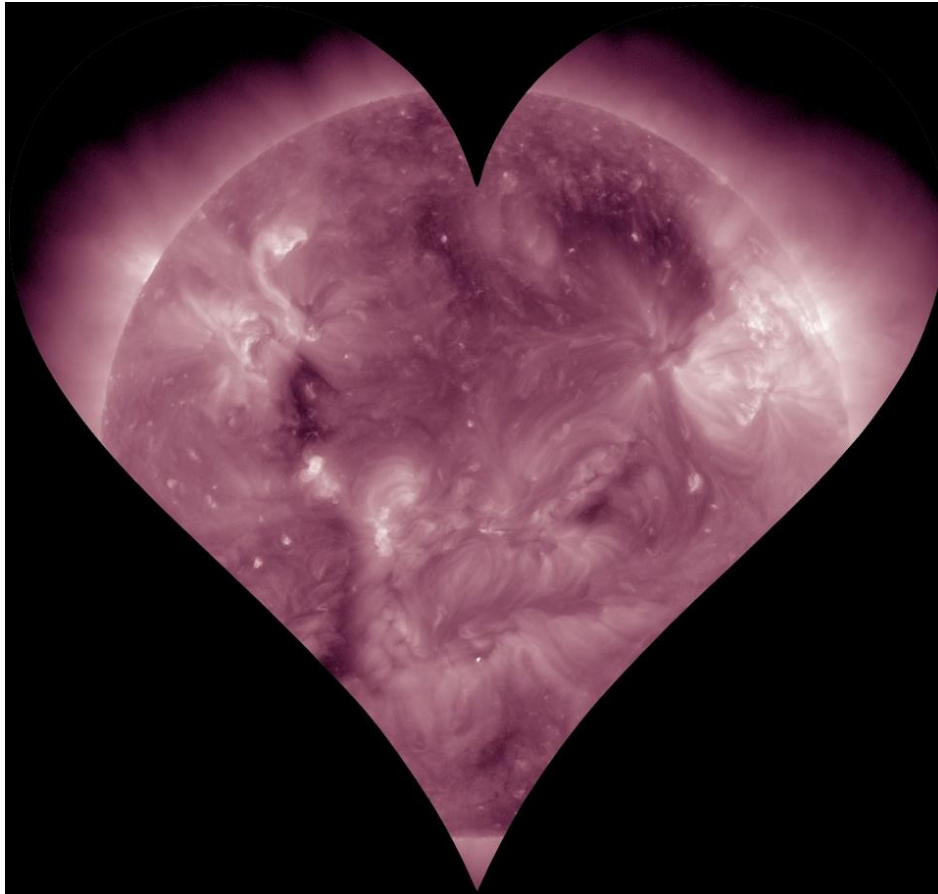
Group of Solar Astrophysics  
Observatorio Astronómico Nacional  
Universidad Nacional de Colombia

Astrolunch  
Universidad de los Andes  
Marzo 2014

# ¡Fulguraciones solares!



# Idea principal de esta charla.



# Resumen

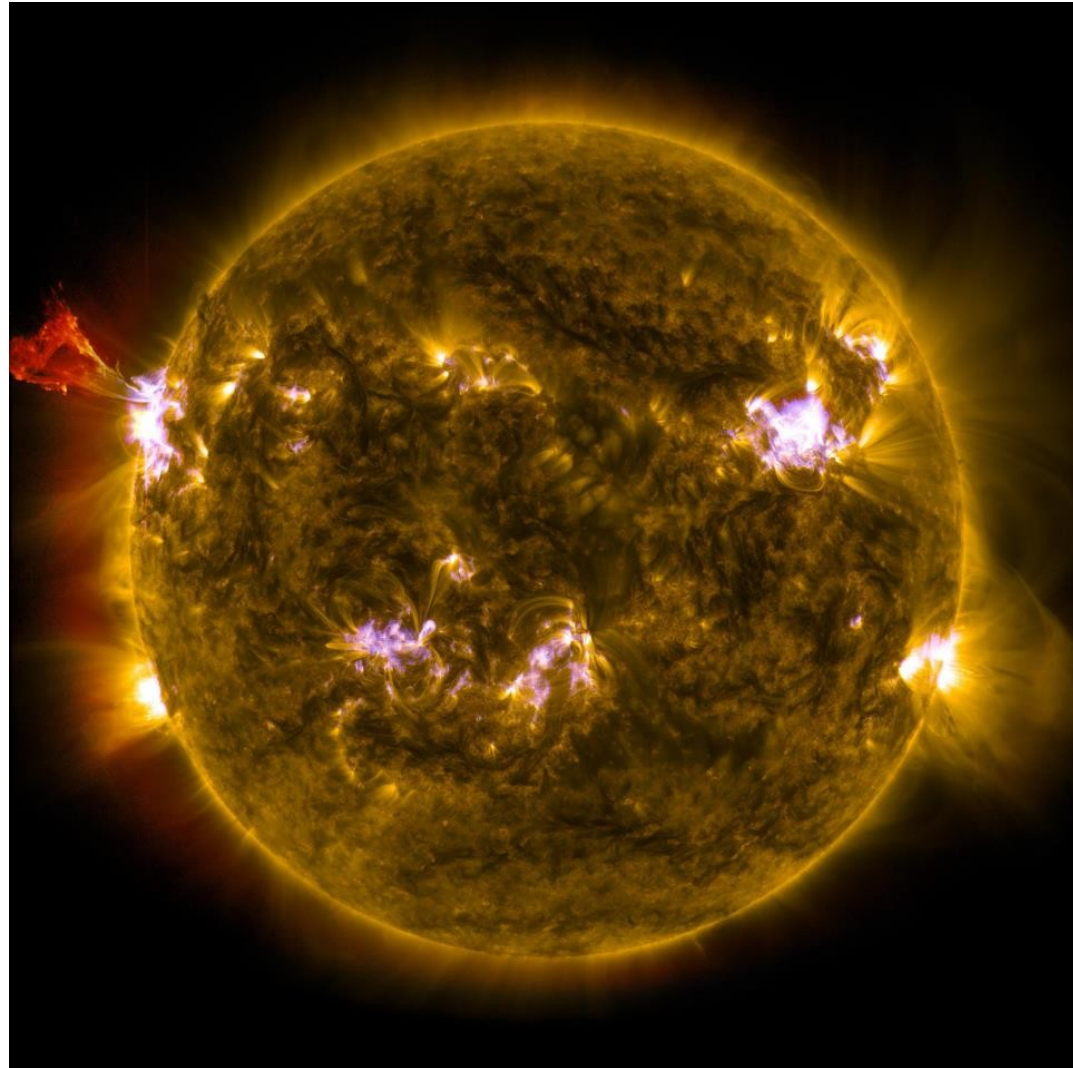
## ❖ Introducción

### ❖ Conceptos básicos

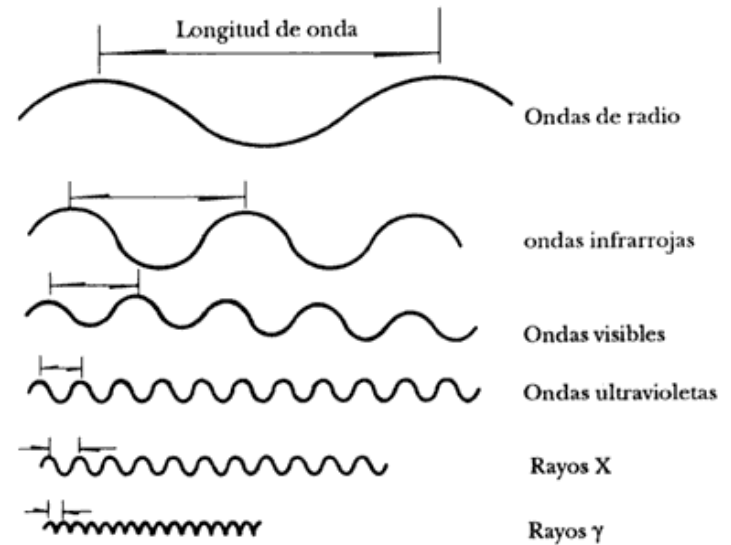
## ❖ El Sol

## ❖ Fenómenos solares

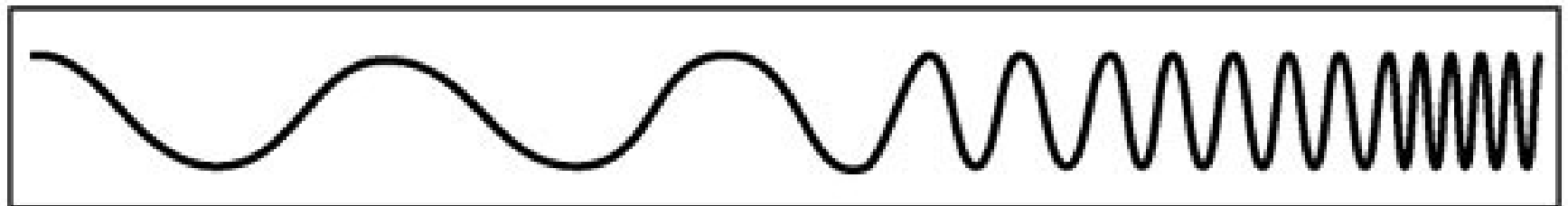
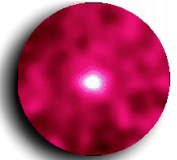
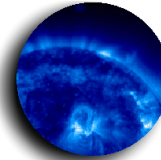
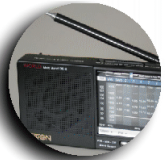
## ❖ Fulguraciones solares



# Y se hizo la luz!



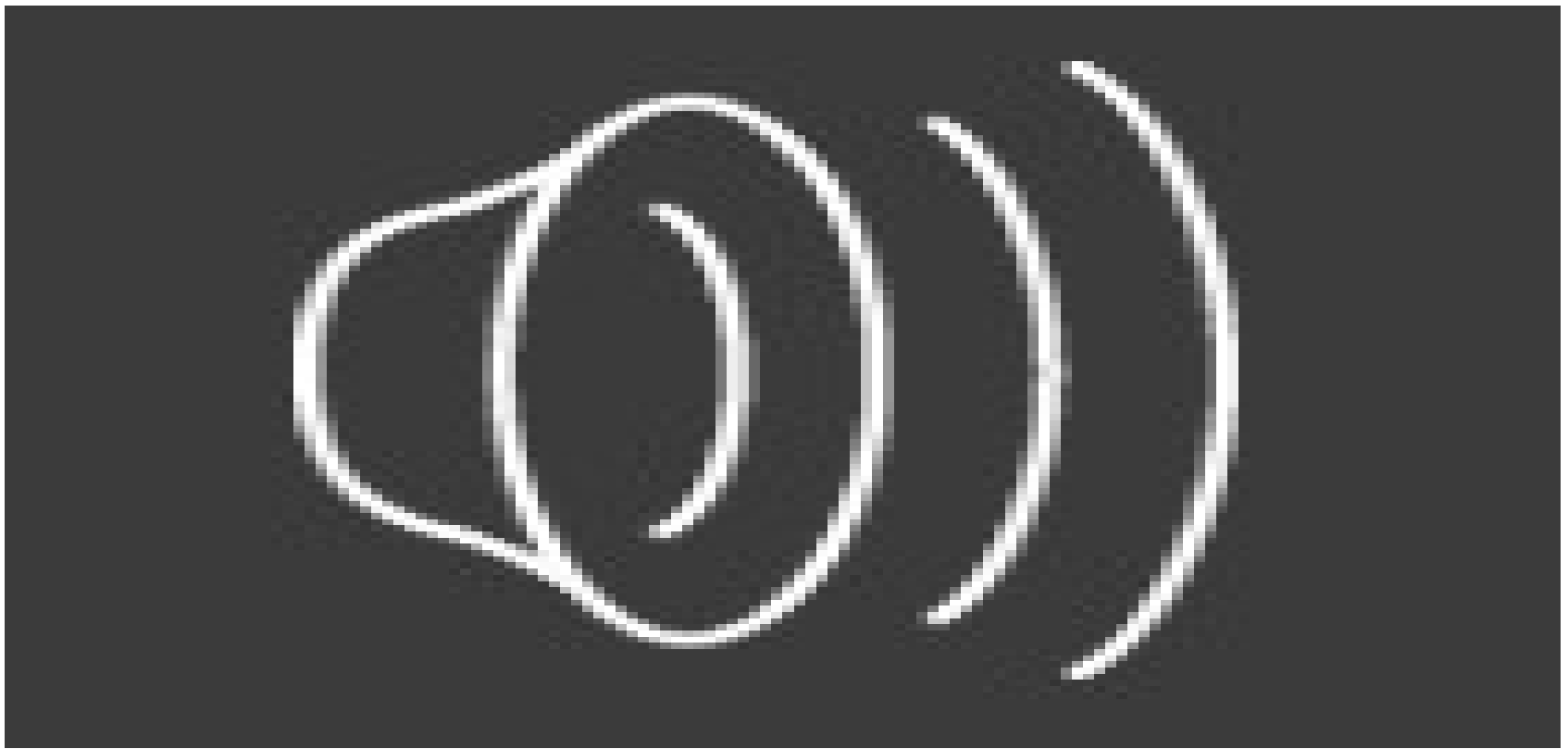
# Del radio al los rayos gamas.



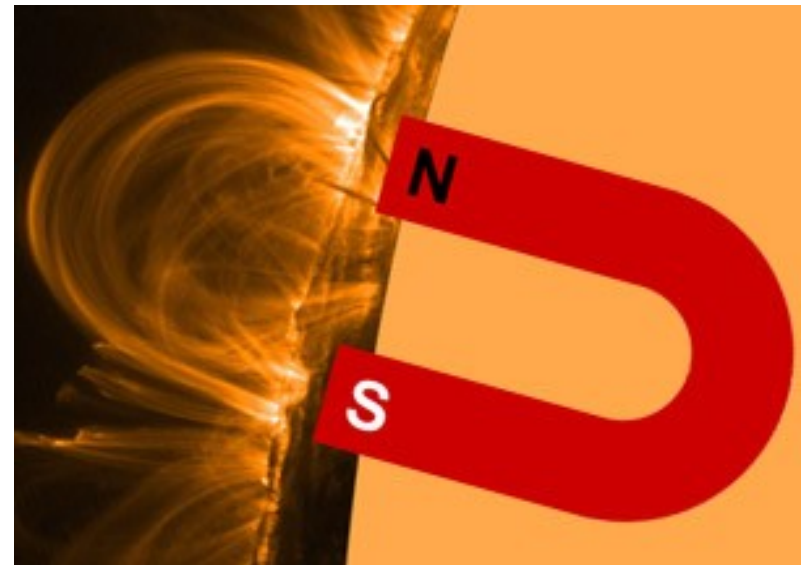
El sol





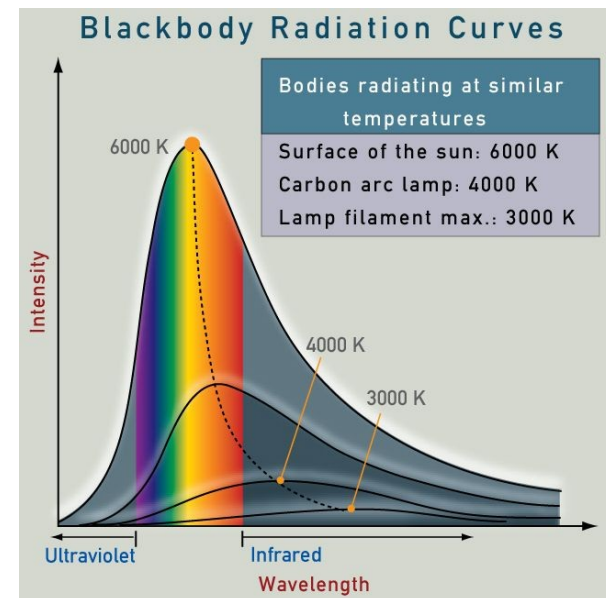
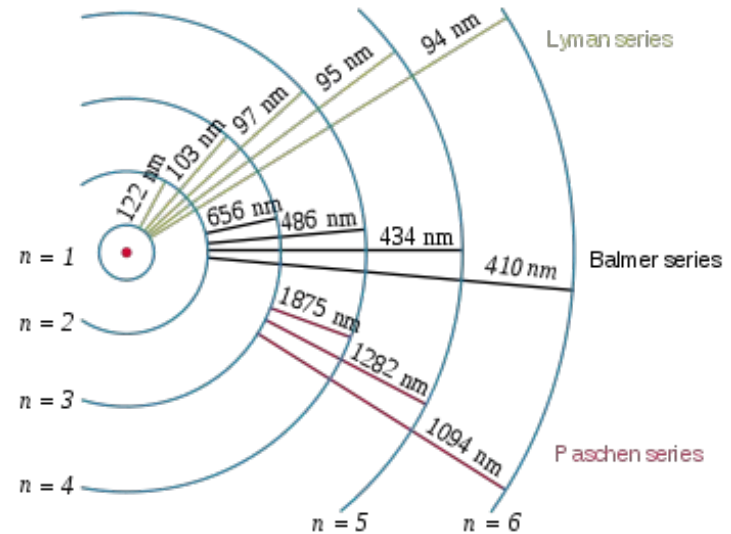


El jefe:  
Campo magnético!

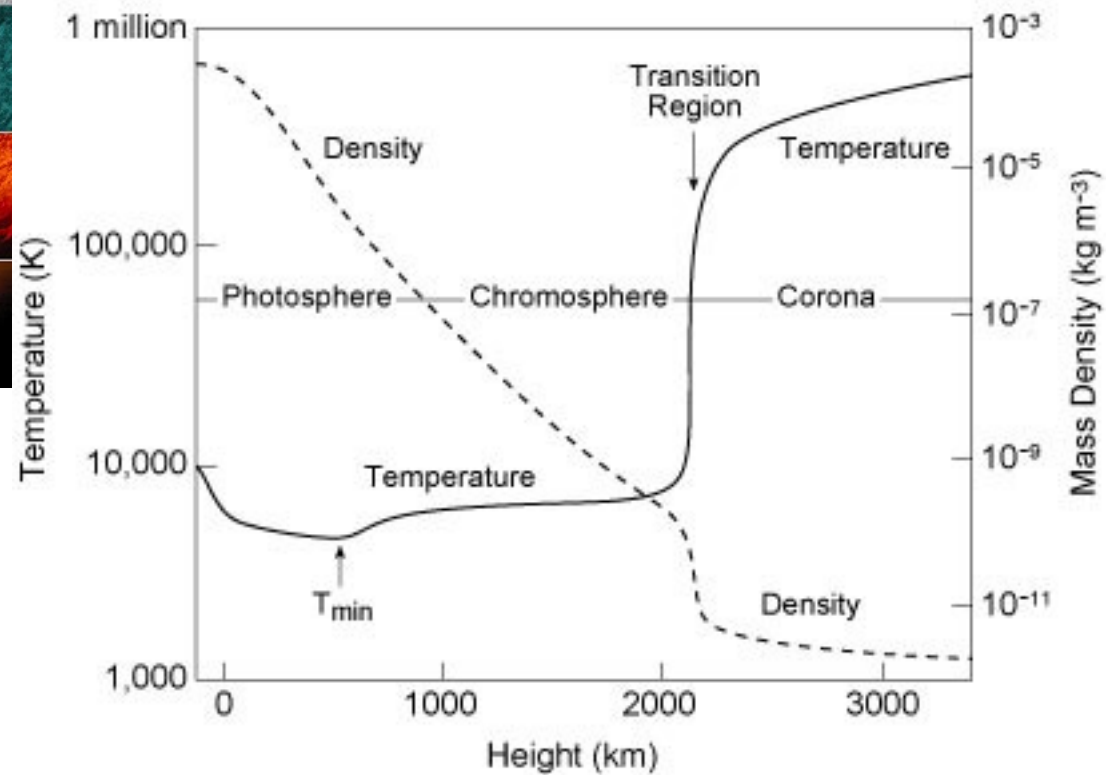
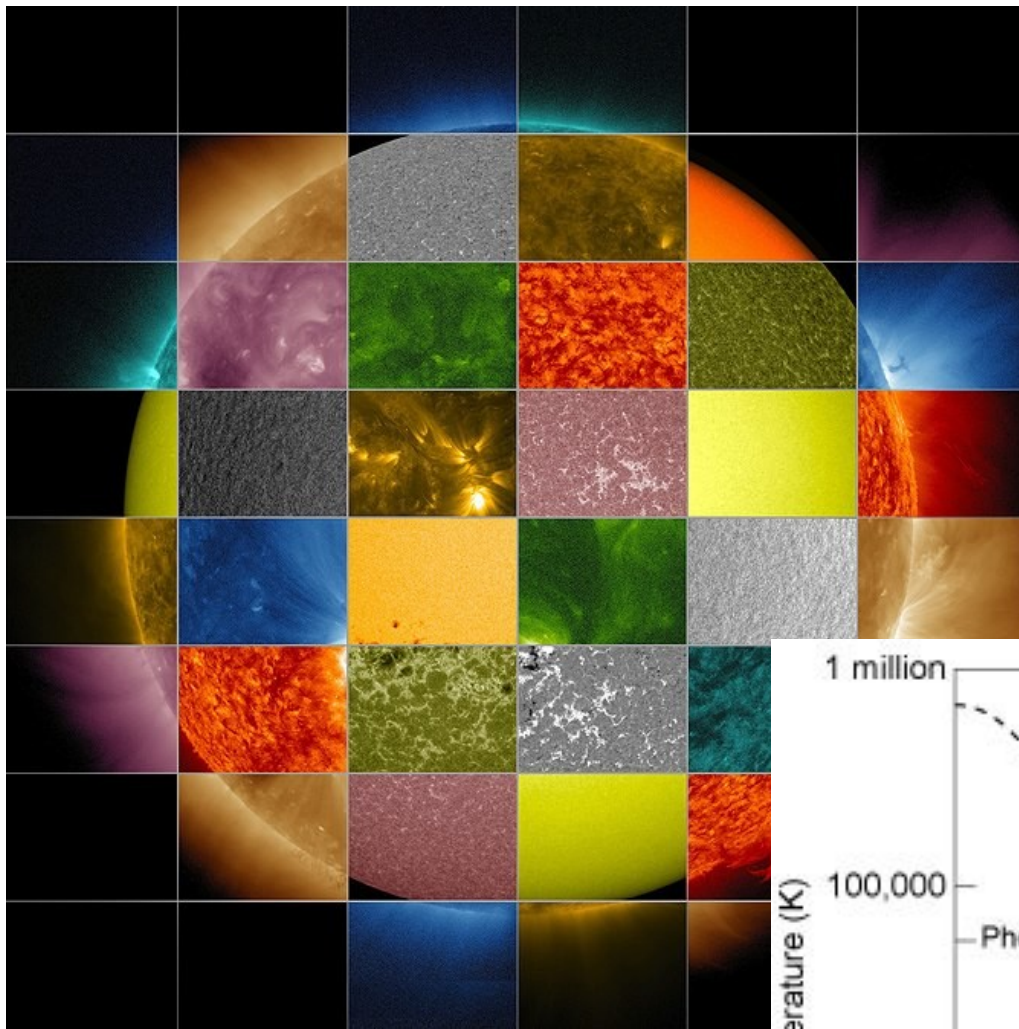




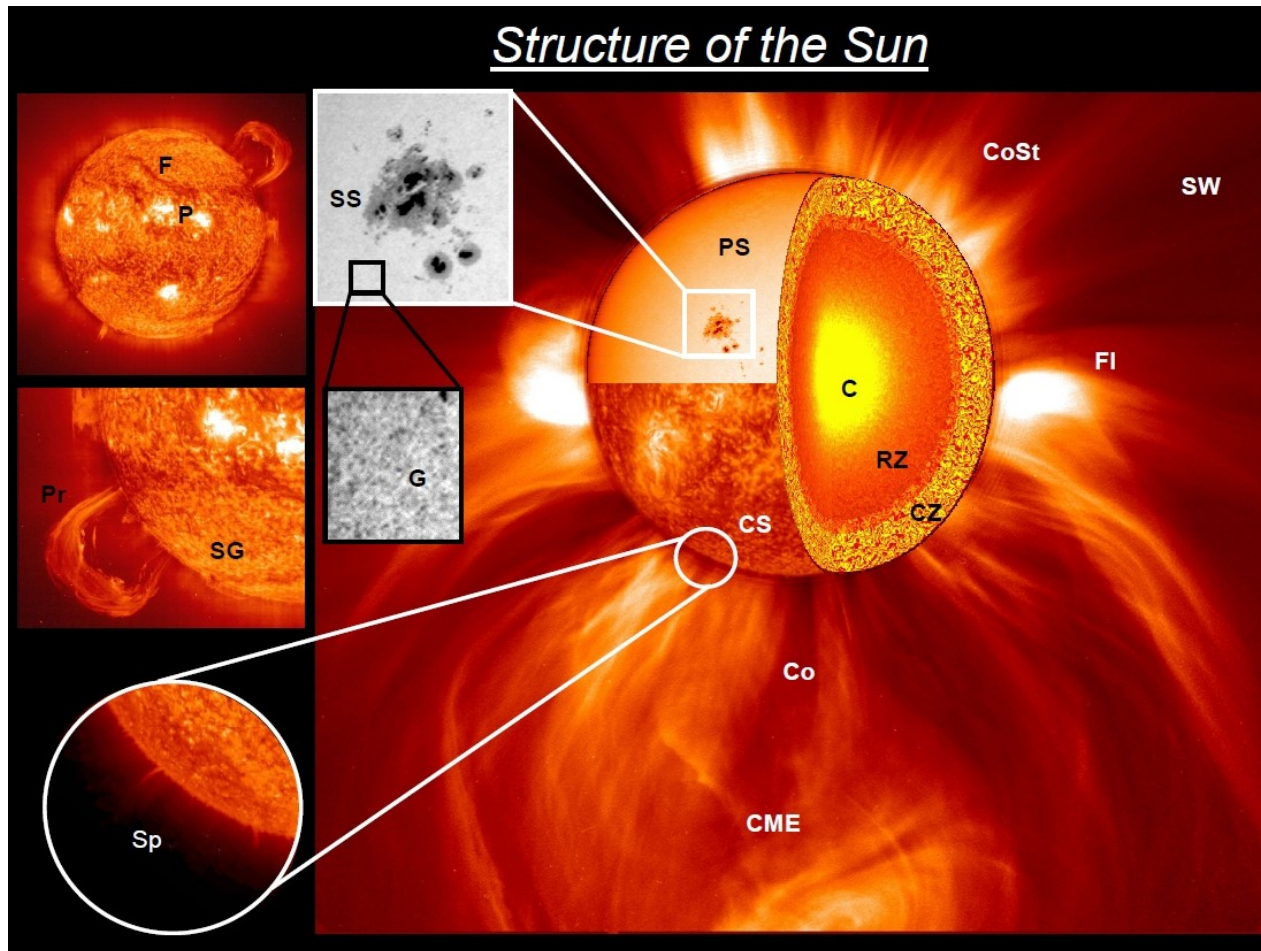
# Mecanismos



# El sol

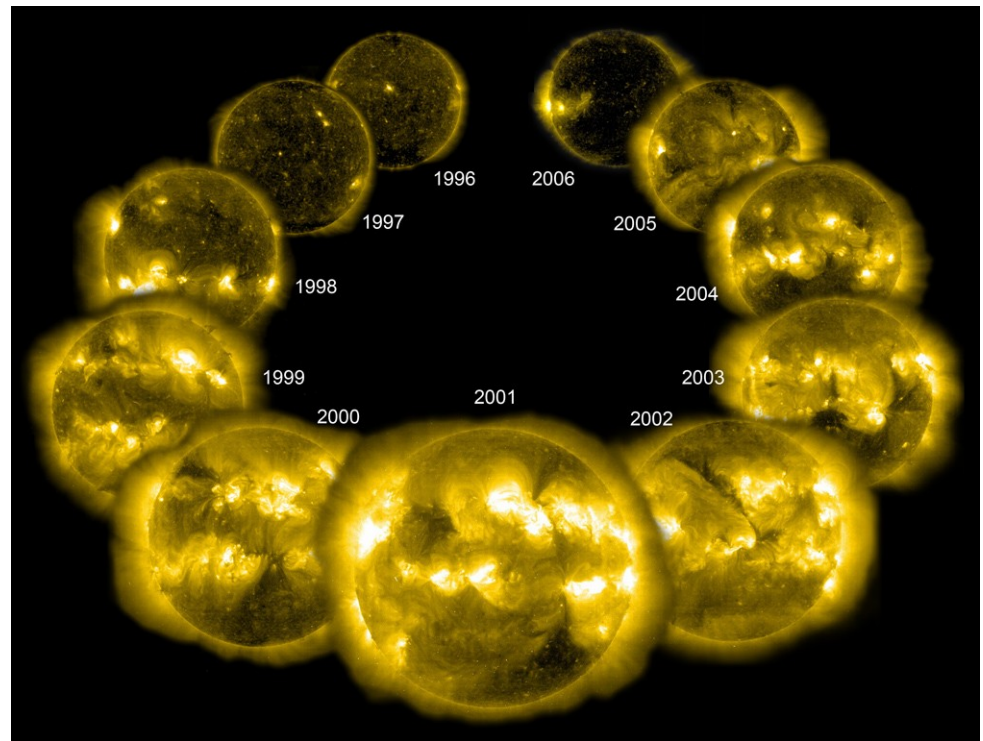
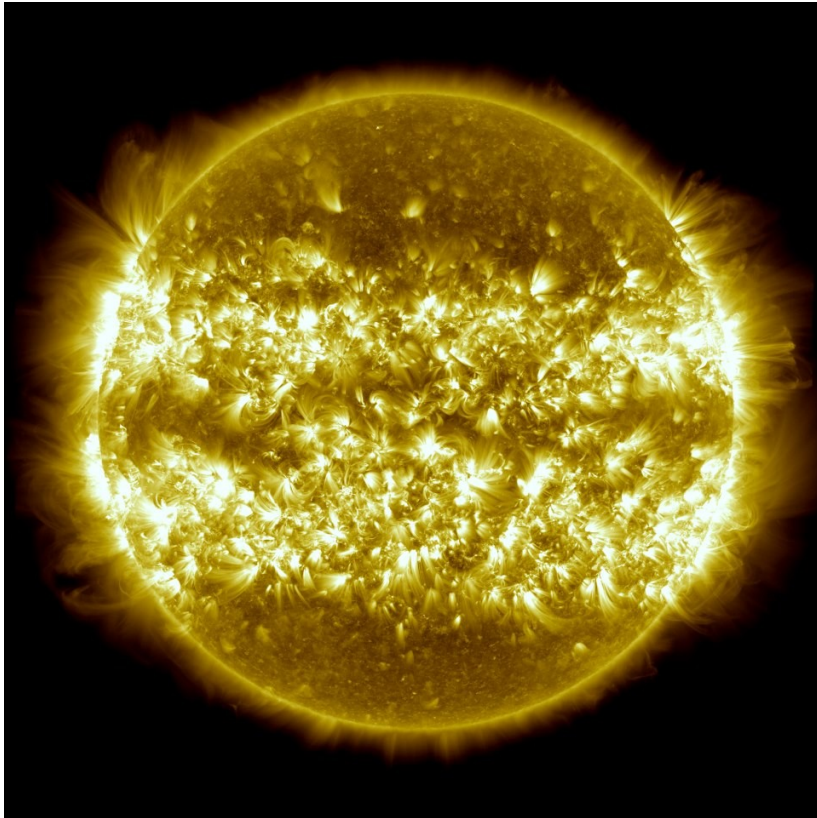


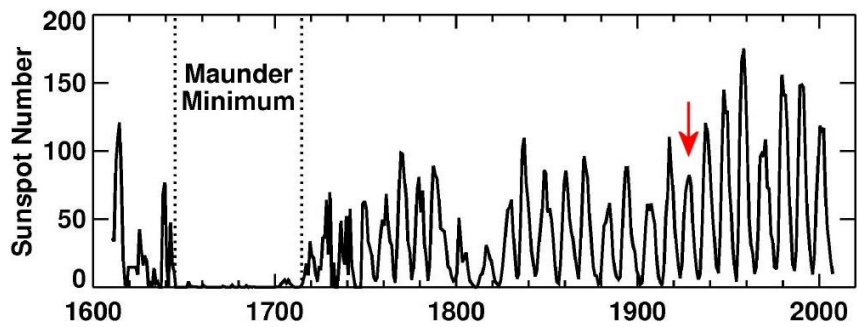
# El sol





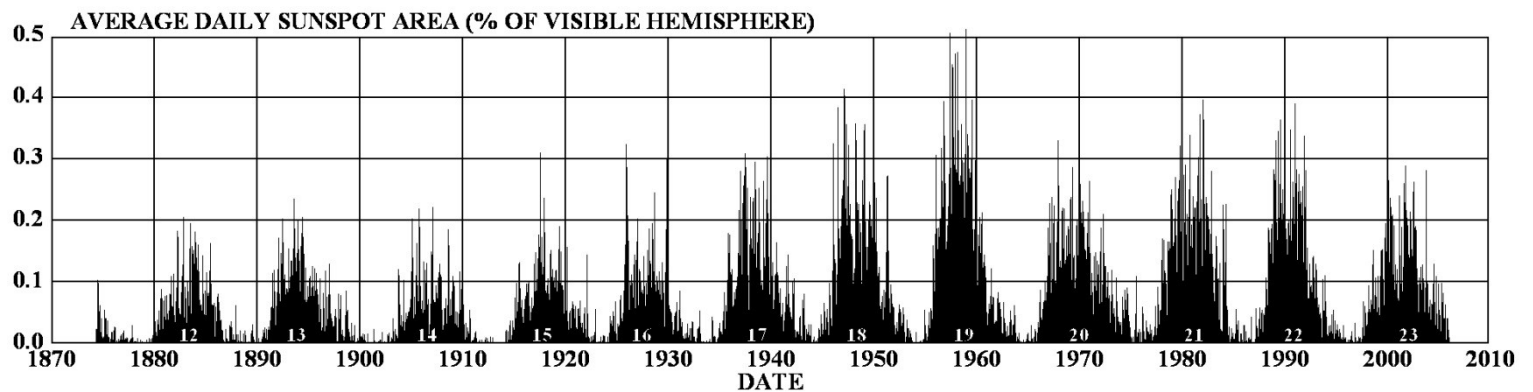
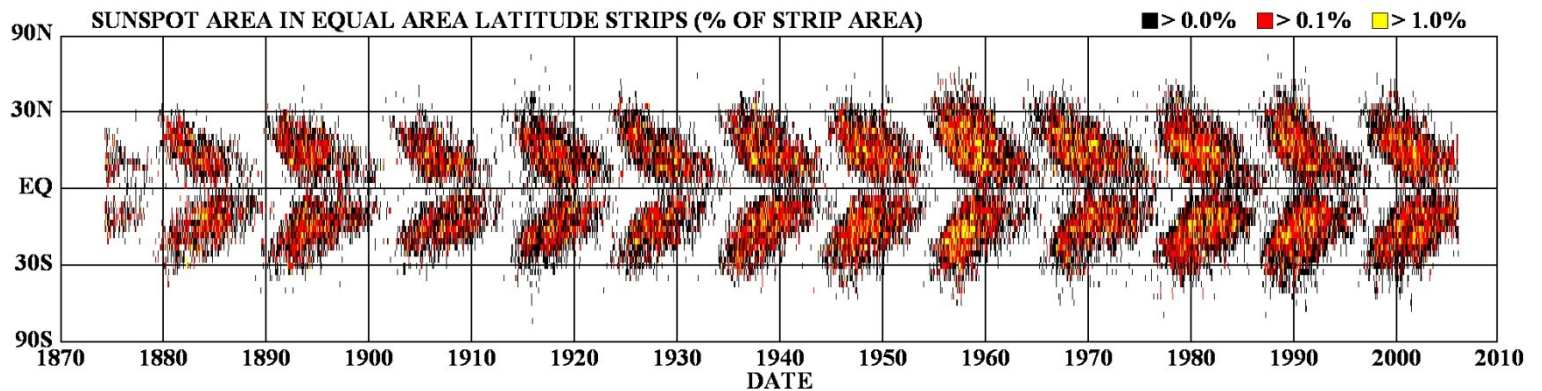
# Ciclo solar





# Ciclo solar

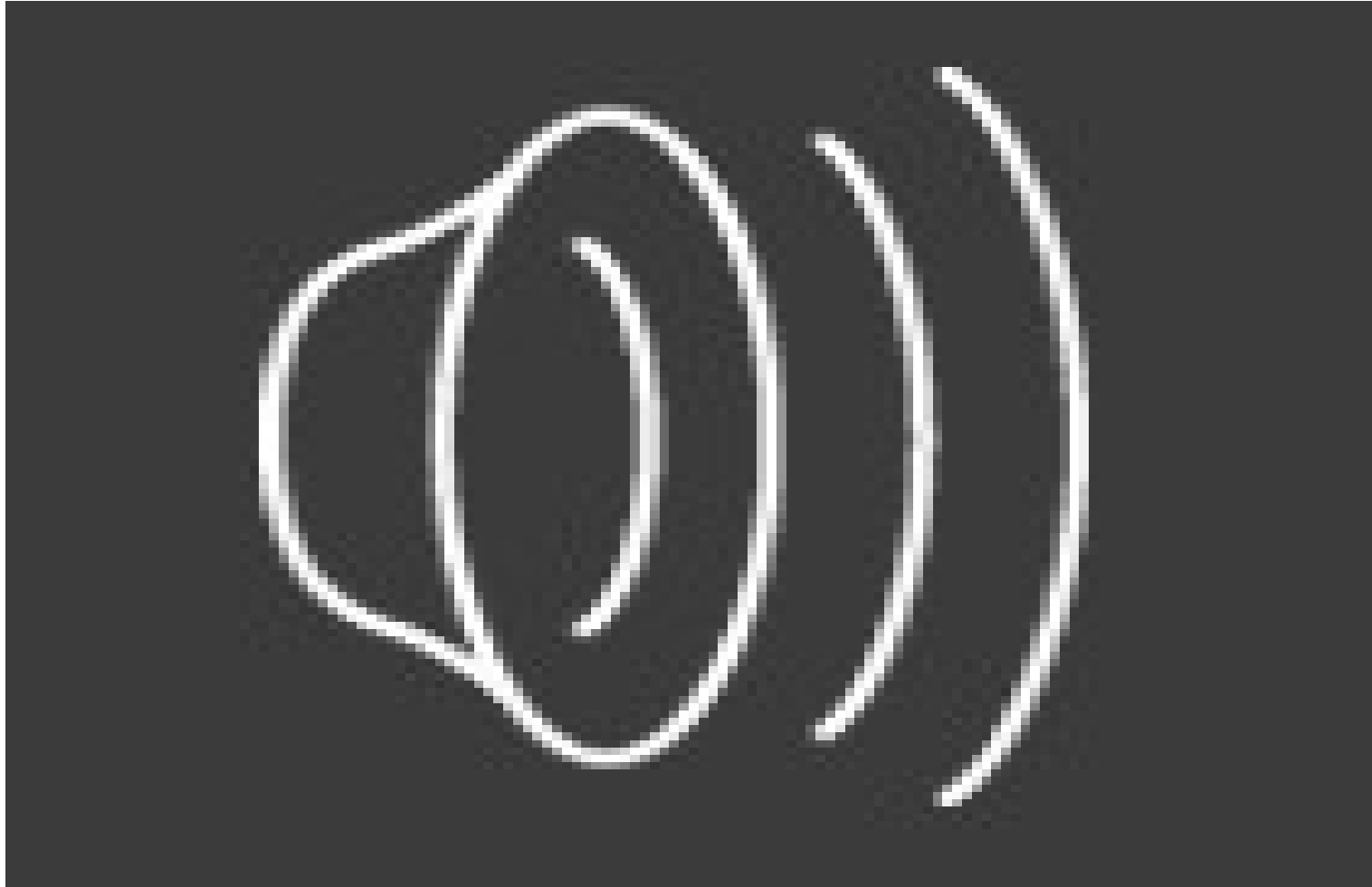
## DAILY SUNSPOT AREA AVERAGED OVER INDIVIDUAL SOLAR ROTATIONS



# Teorías dinamo



# Hoyos coronales



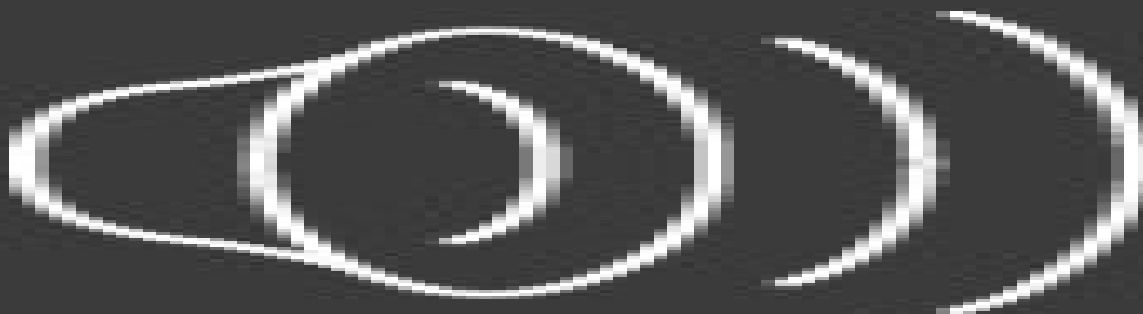


# Bucles (Loops)

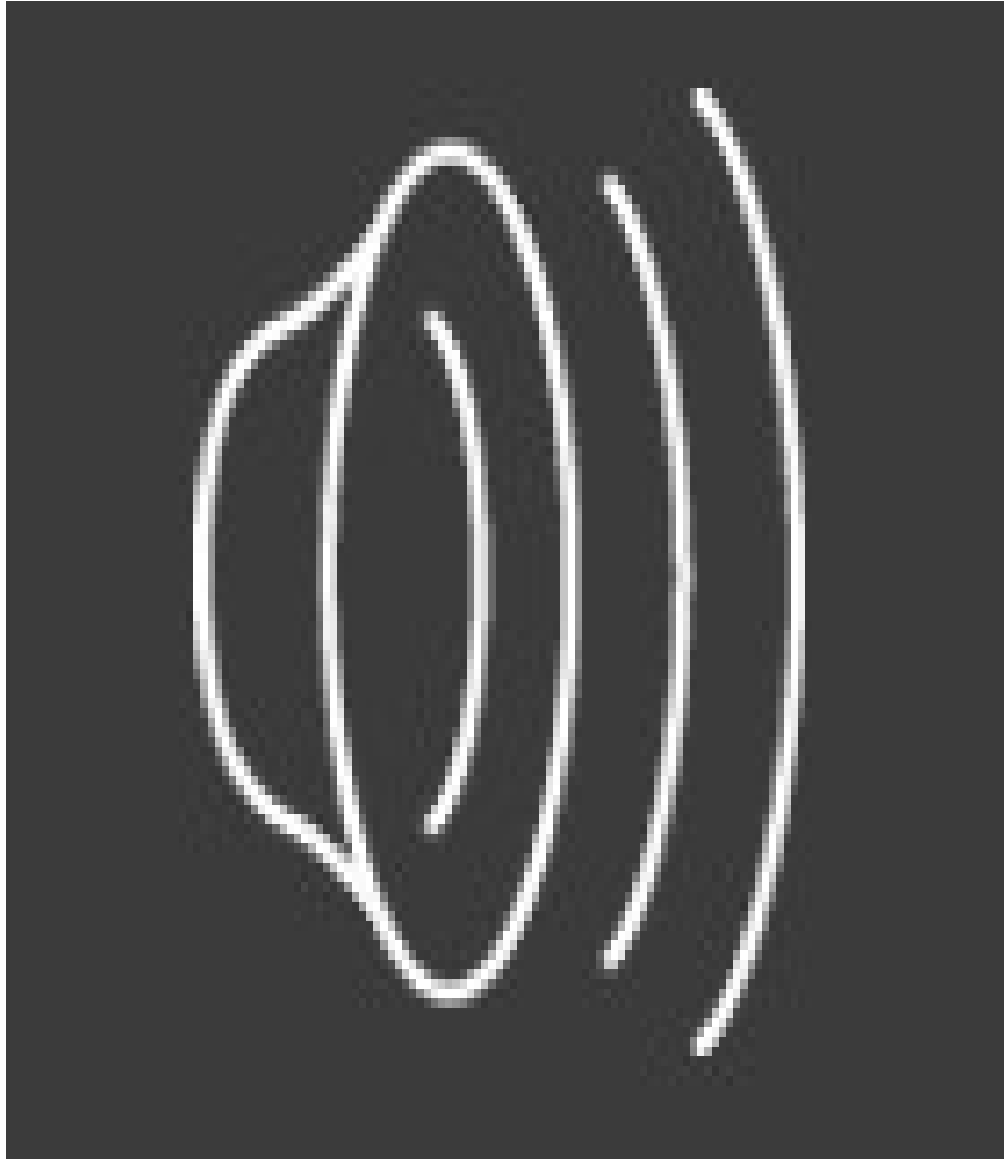




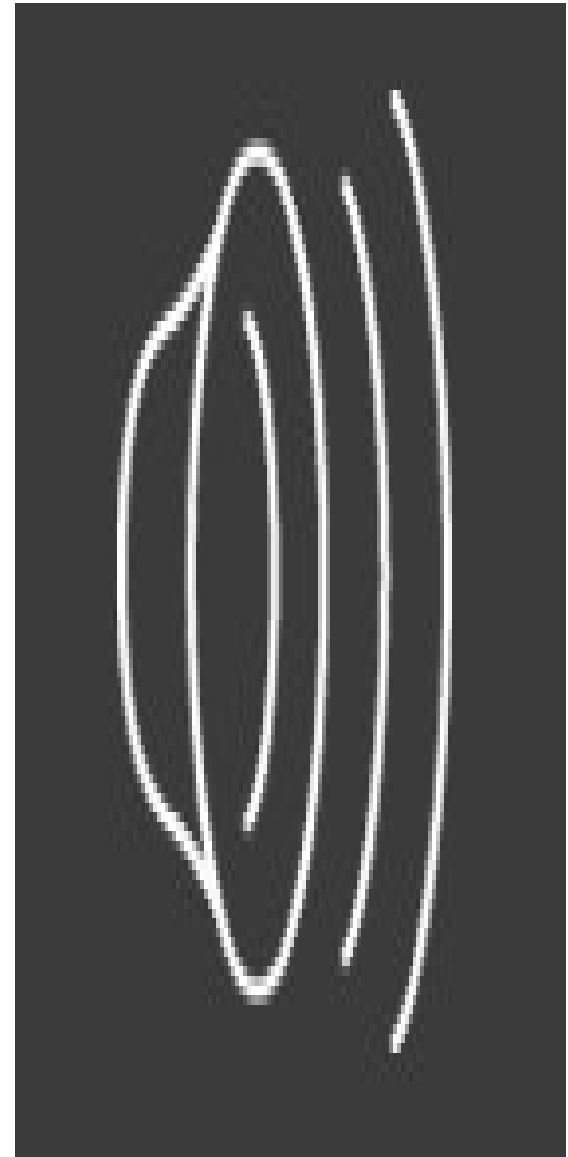
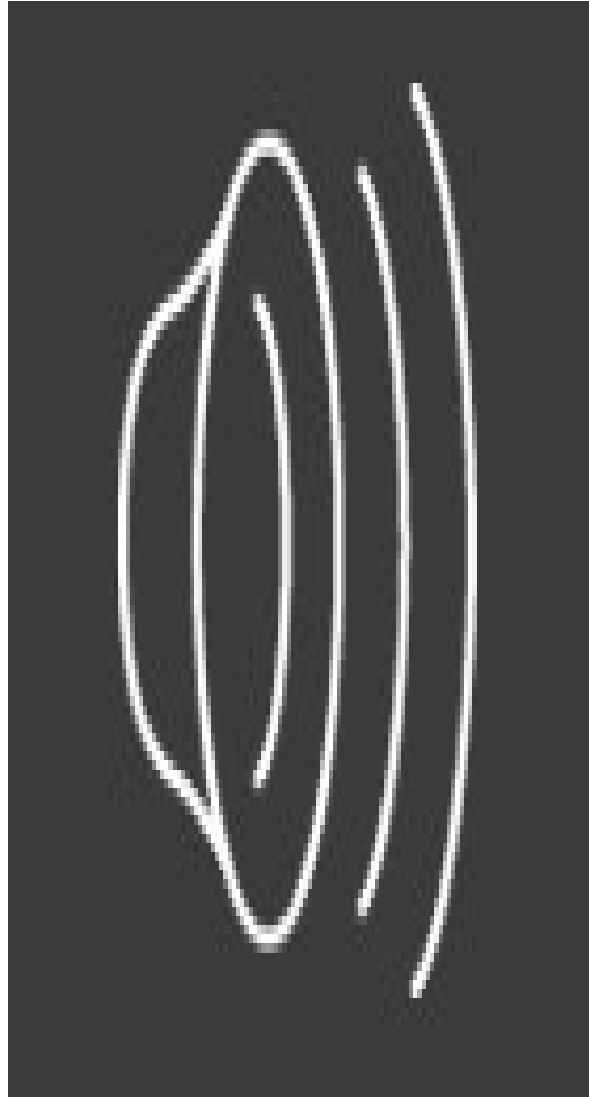
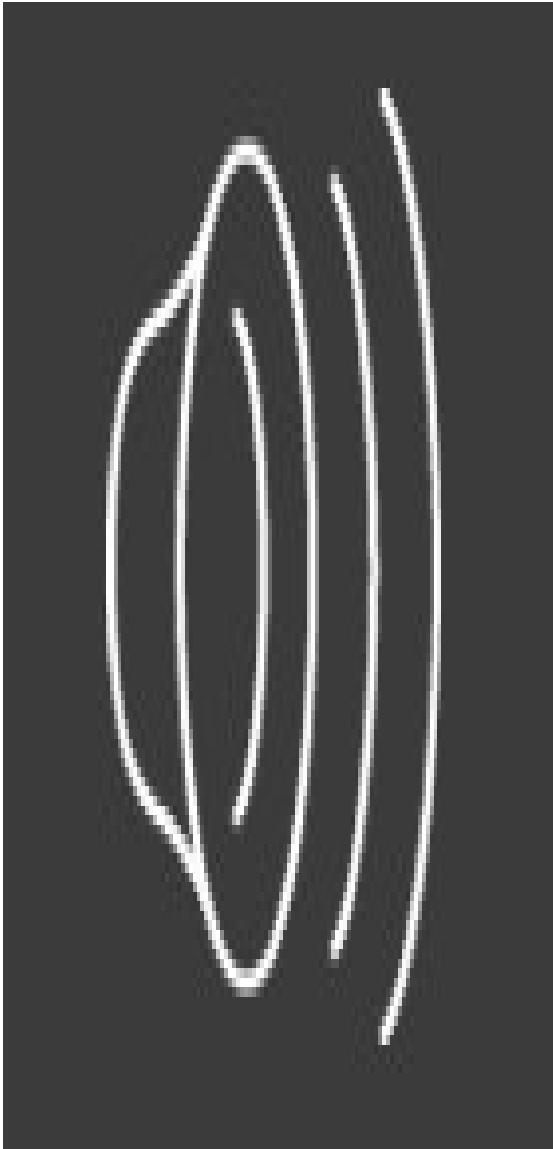
Espículas



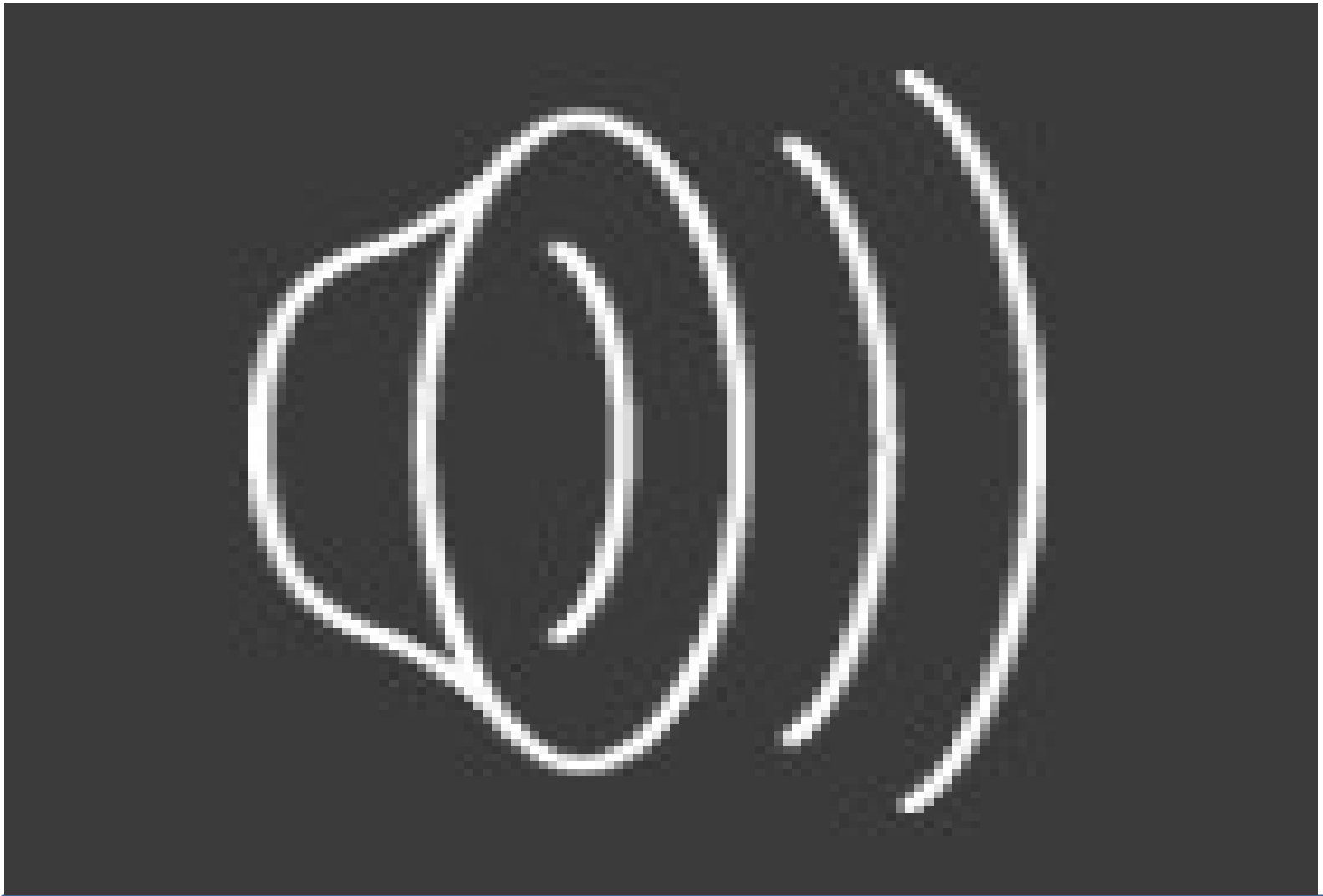
# Filamentos



# Machas solares



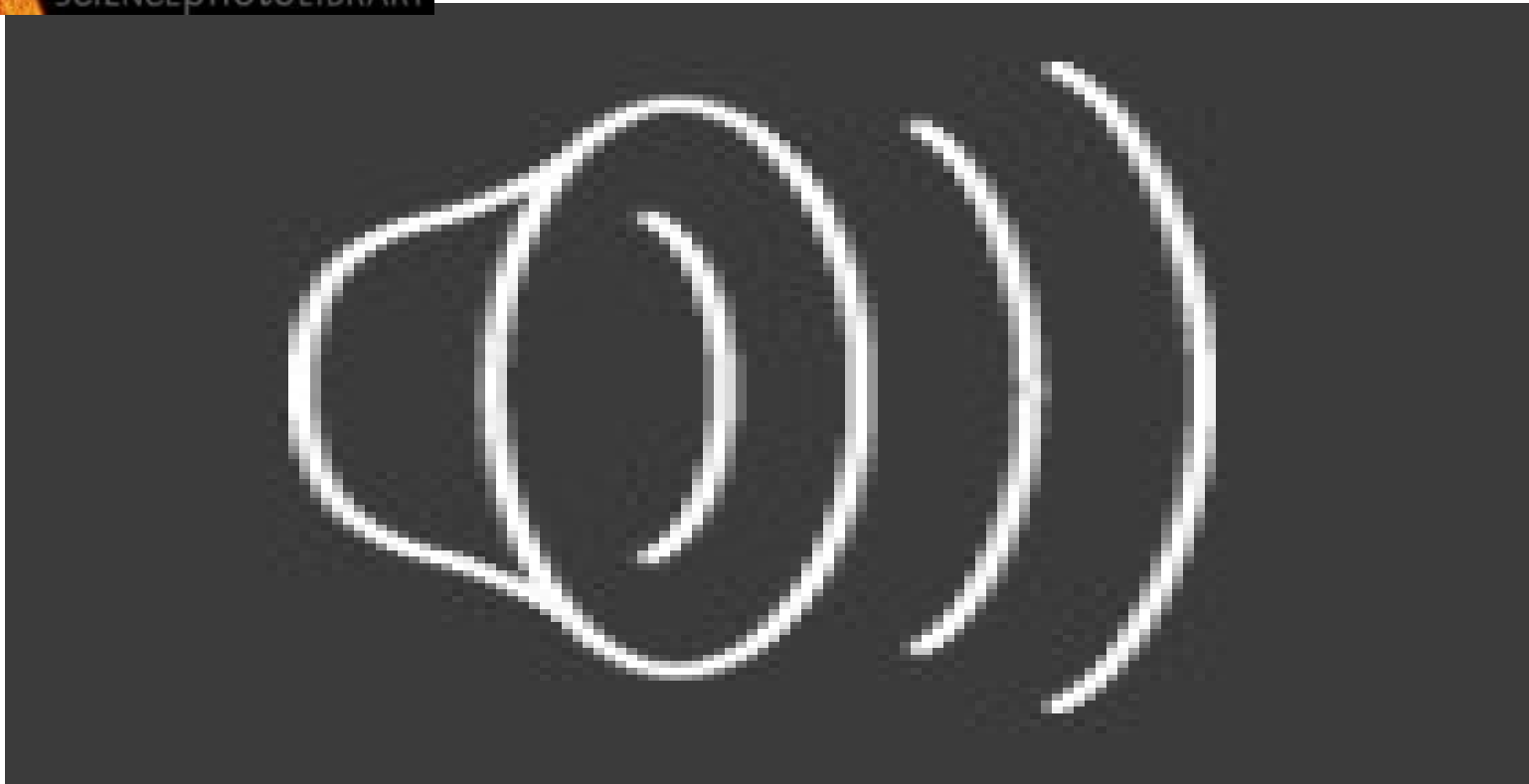
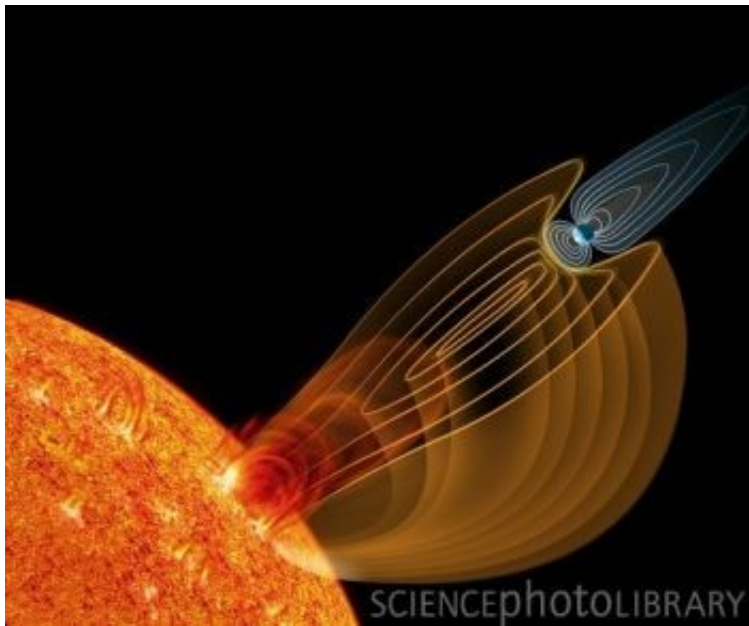
# Eyecciones coronales de masa (CME)



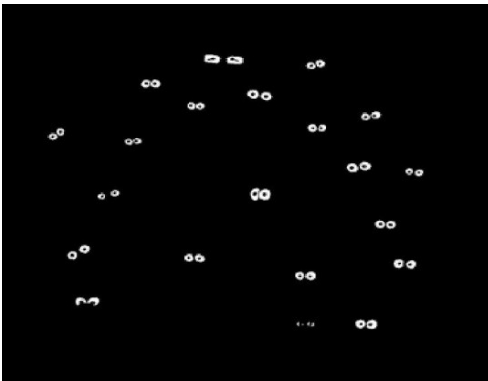
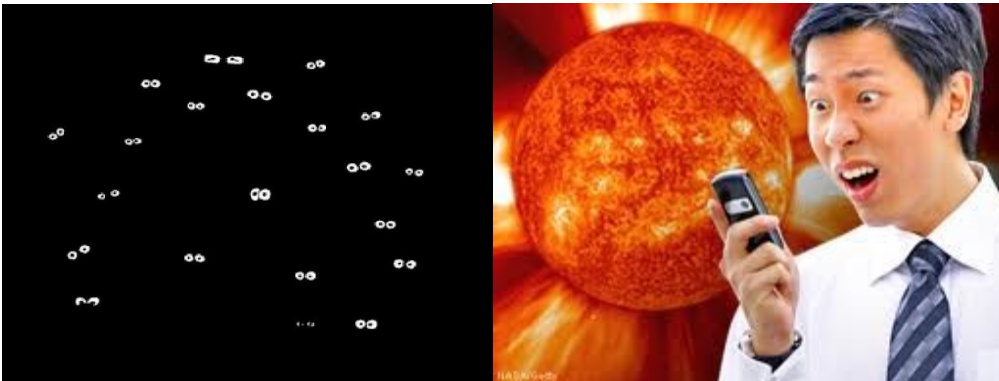
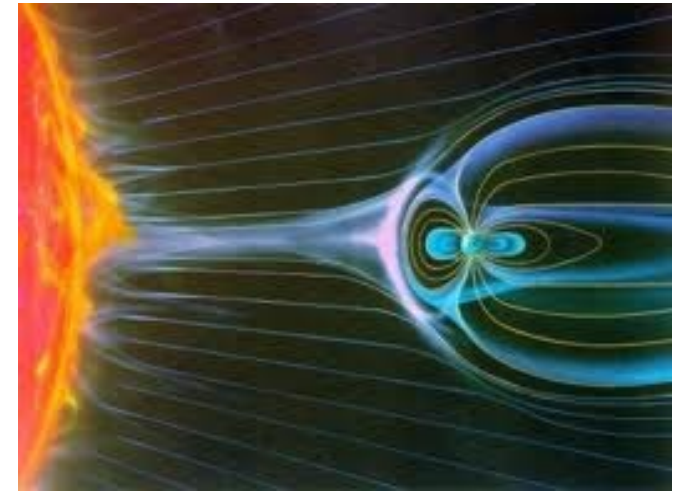
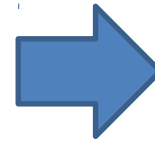
**$10^{18}$  veces la bomba de hiroshima y nagasaki !!!**

**veces la bomba de hiroshima y nagasaki !!!**

# Auroras



# ¿Por qué estudiar las fulguraciones?



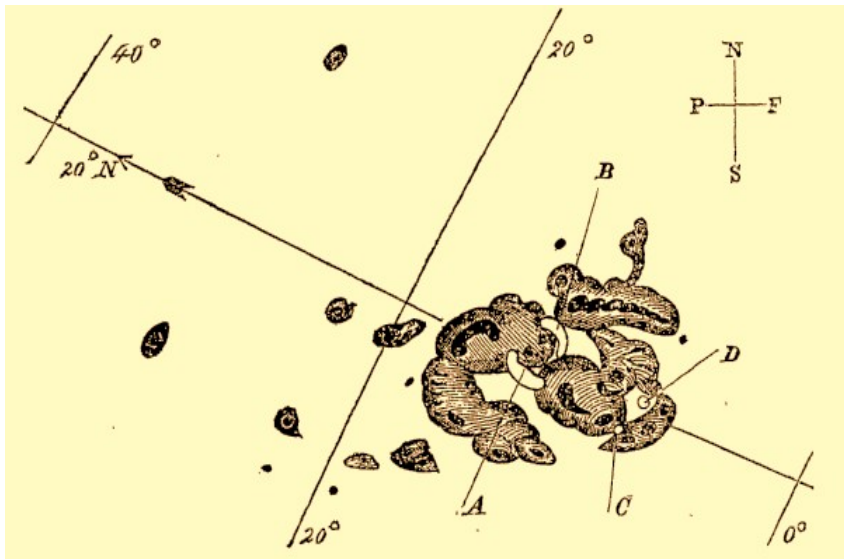


Es solo el comienzo... fulguraciones!



# Solar flares (Fulguraciones o llamaradas)

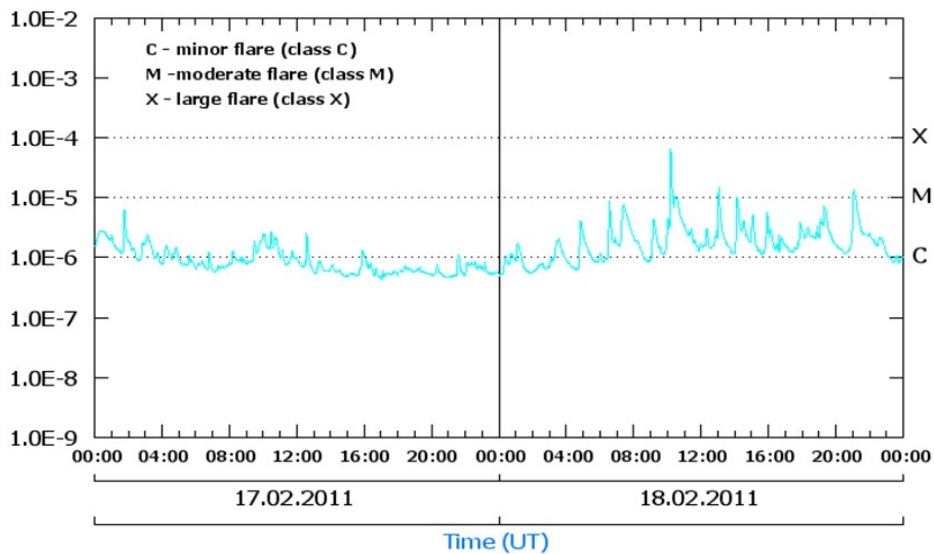
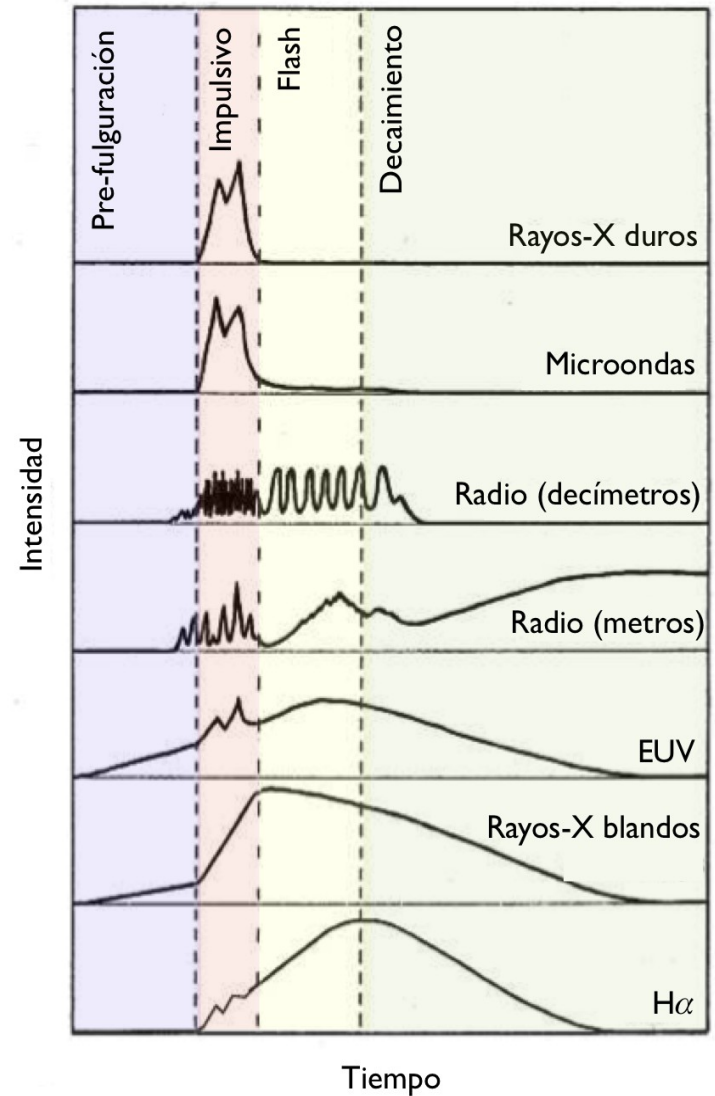
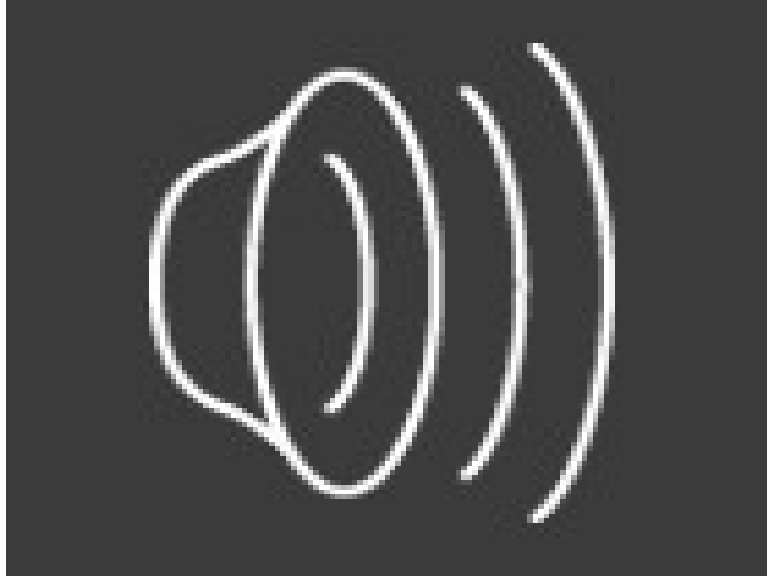
**R.C Carrington y R. Hodgson,  
1859**



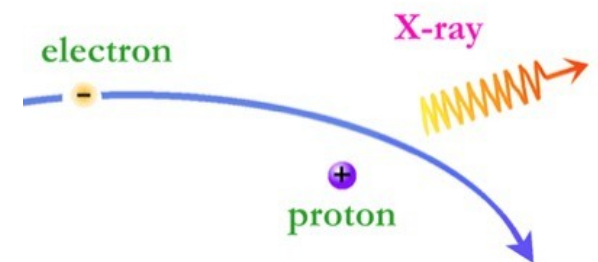
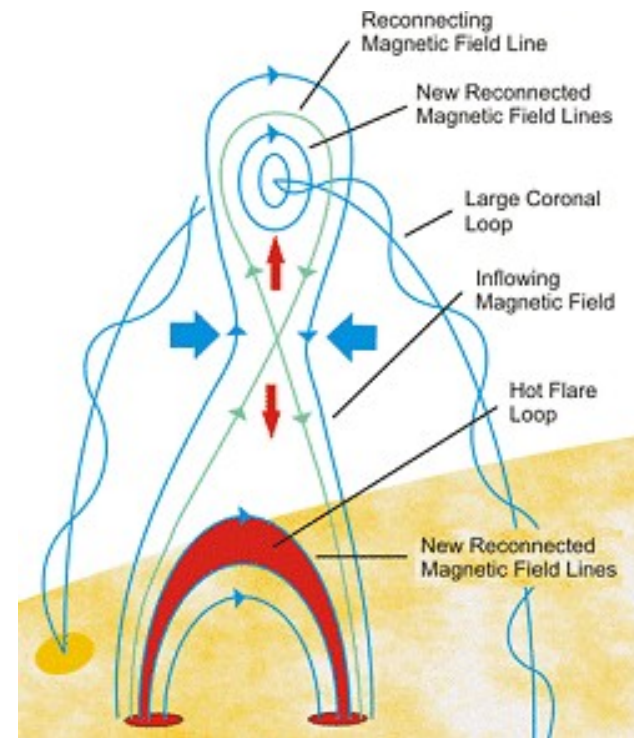
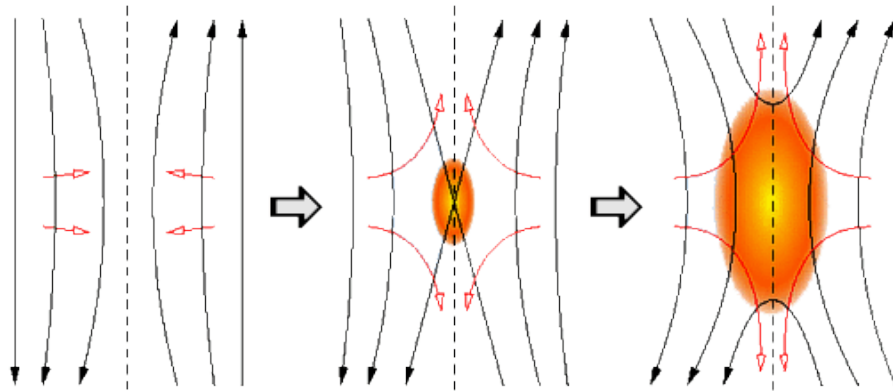
*«... La razón más fuerte para el uso de la palabra 'flare' es debido a que esa sola palabra combina los rasgos más sobresalientes de este fenómeno: aparición súbita, gran brillantez, y la rápida variación in intensidad...»*

**Richardson, 1944**

# Fases y clasificación



# Flares



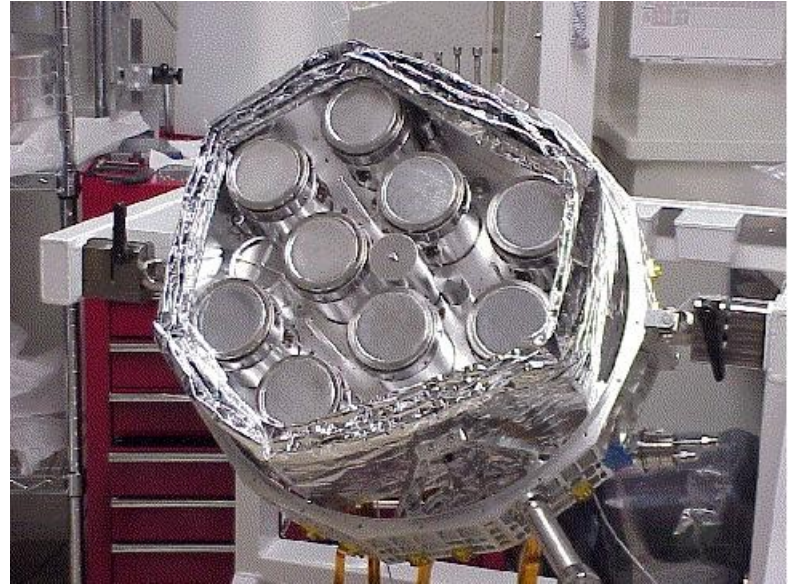
# White light flares

- **El estatus de WLF se da a la fulguraciones que muestran un exceso en la emisión del continuo**
- **La escala de tiempo es de los minutos**
- **Proceso fotosférico y/o cromosférico(?)**
- **WLF se observan:**
  - **Gracias al contraste con la región activa.**
  - **Cerca al limbo solar.**





# Instrumentos

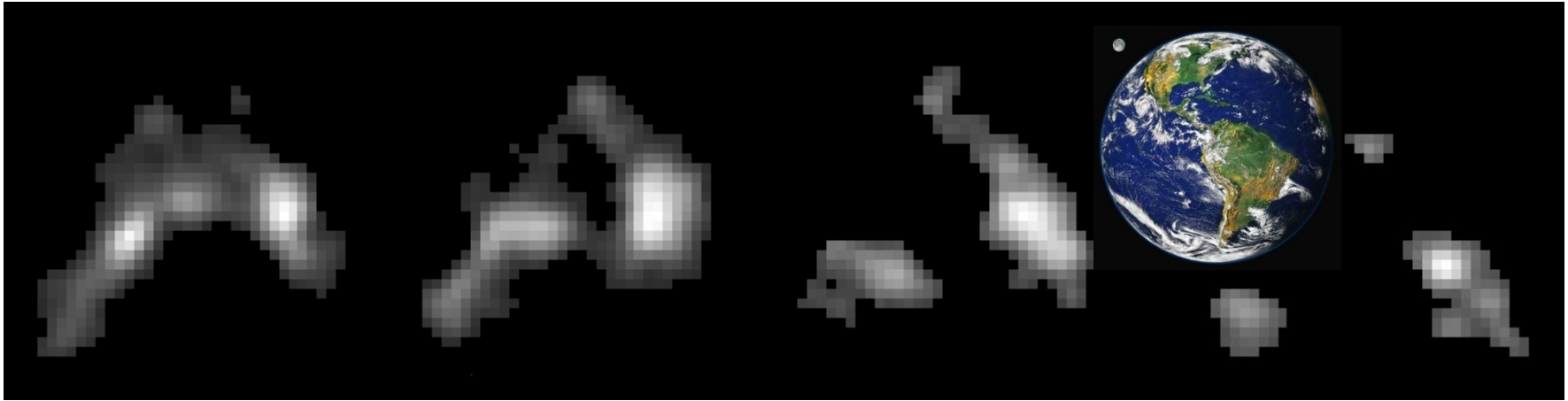


# Observaciones: ejemplos

Date: July 30 of 2011

Peak: 02:09

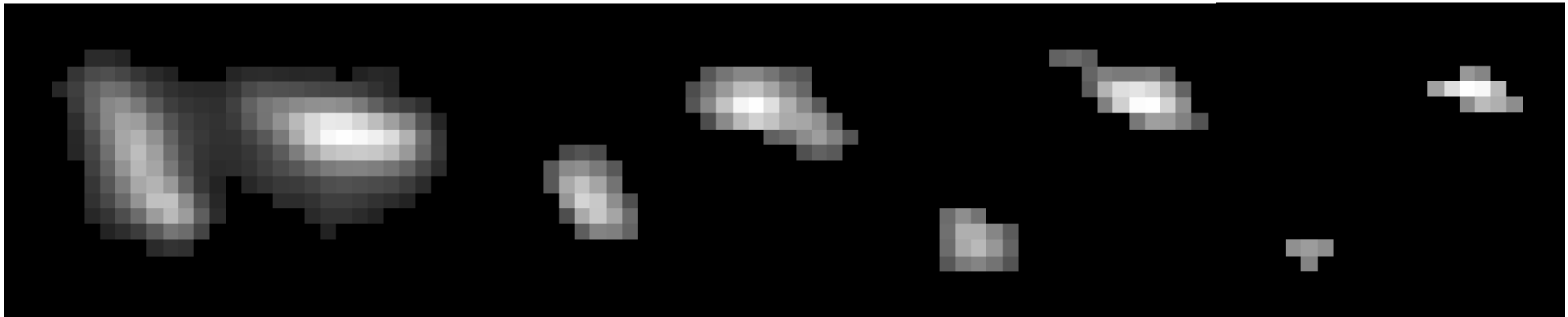
GOES Class: M9.3



Date: July 5 of 2012

Peak: 03:36

GOES Class: M4.7



**Tiempo de evolución del white-light flares** 



A word cloud featuring the word "THANK YOU" in large, bold, black letters. Surrounding it are various translations of "Thank You" in different languages, including: GRACIAS, ARIGATO, SHUKURIA, JUSPAXAR, DANKSCHEEN, TASHAKKUR ATU, YAQHANYELAY, SUKSAMA, EKHMET, BİYAN, SHUKRIA, TINGKI, GOZAIMASHITA, EFCHARISTO, KOMAPSUNIDA, GRAZIE, MEHRBANI, PALDIES, BOLZİN, and MERCI. The words are arranged in a circular pattern around the central "THANK YOU" text.

