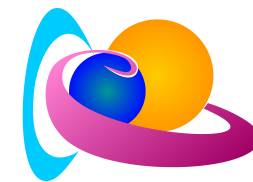


# SPACE WEATHER INTRODUCTORY COURSE



Collaboration of



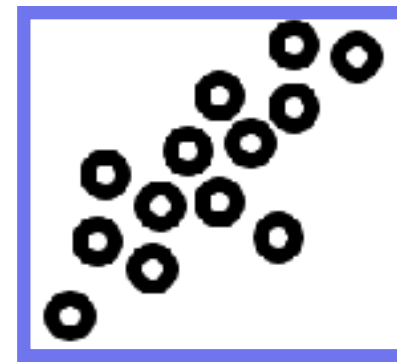
Solar-Terrestrial Centre of Excellence

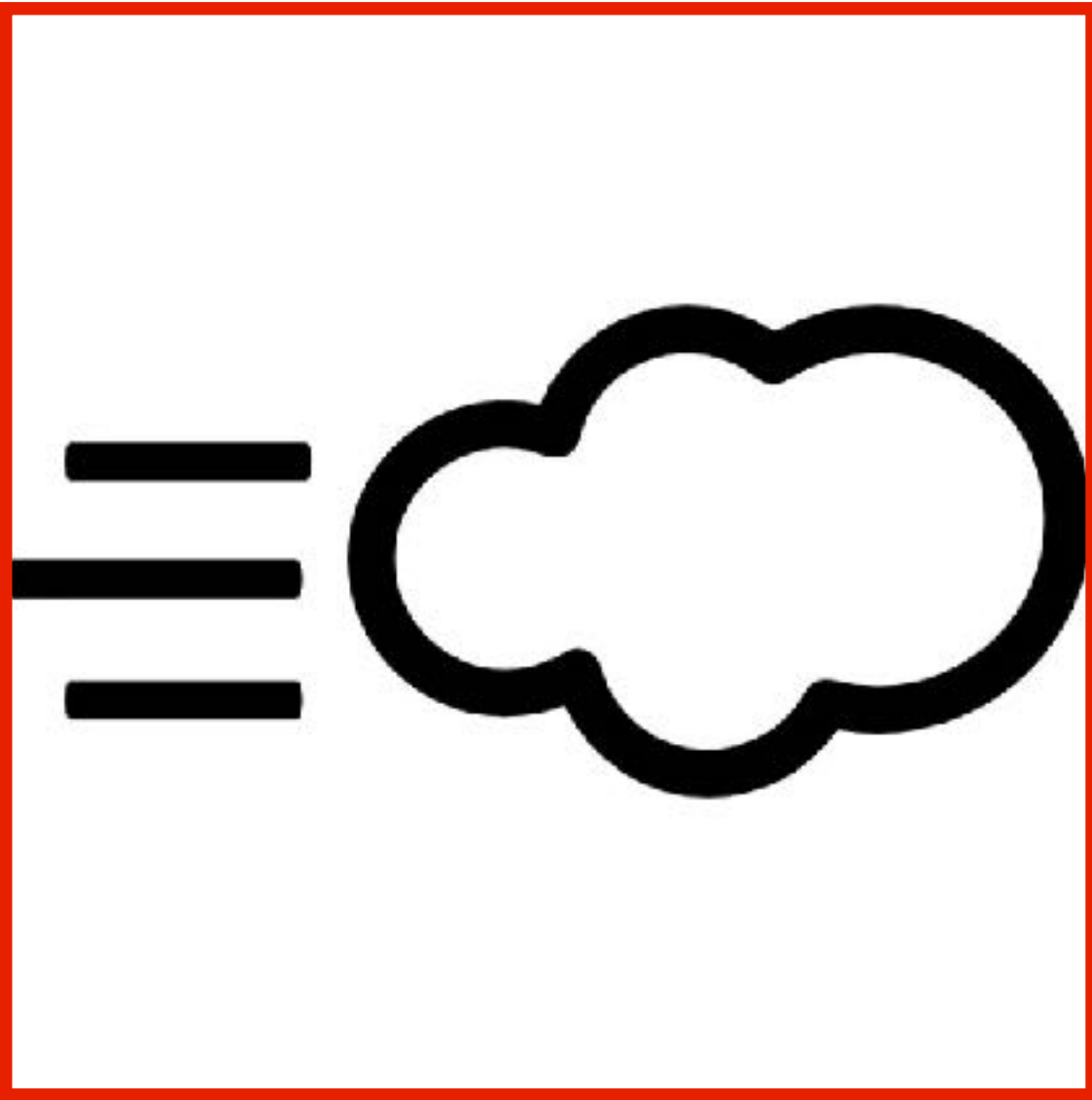


Koninklijke luchtmacht



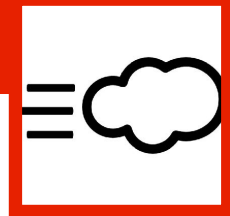
Koninklijk Nederlands  
Meteorologisch Instituut  
*Ministerie van Infrastructuur en Milieu*





SOLAR WIND

# SOLAR WIND



Continuous radial outflow of gas.

Consists of charged particles that can carry magnetic structures.

Shapes the IMF.

# INTERPLANETARY MAGNETIC FIELD + PLASMA

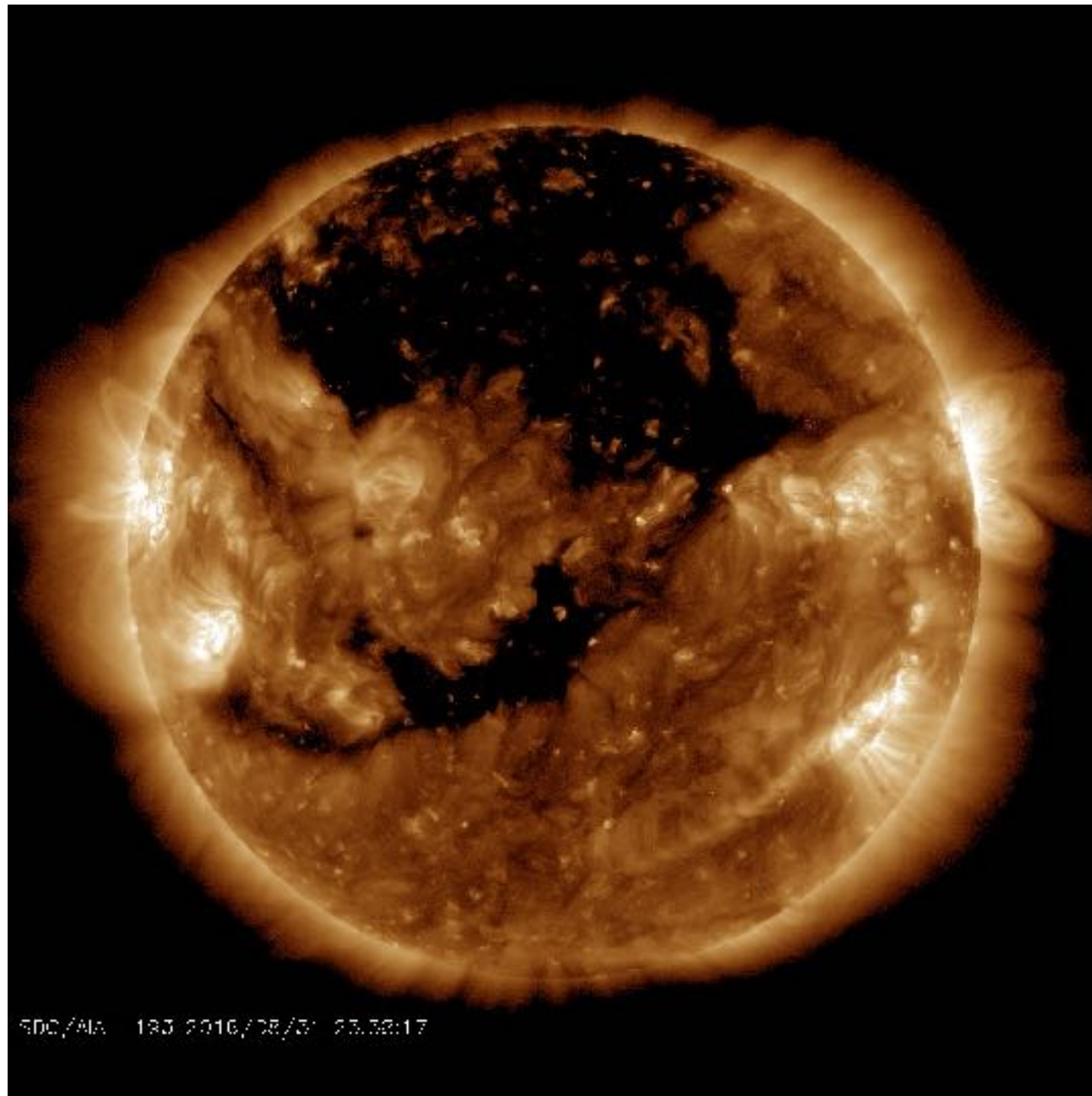
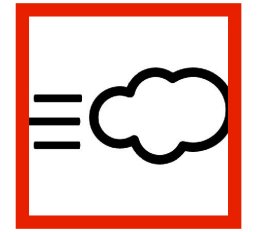


Image: Siberia 20080801

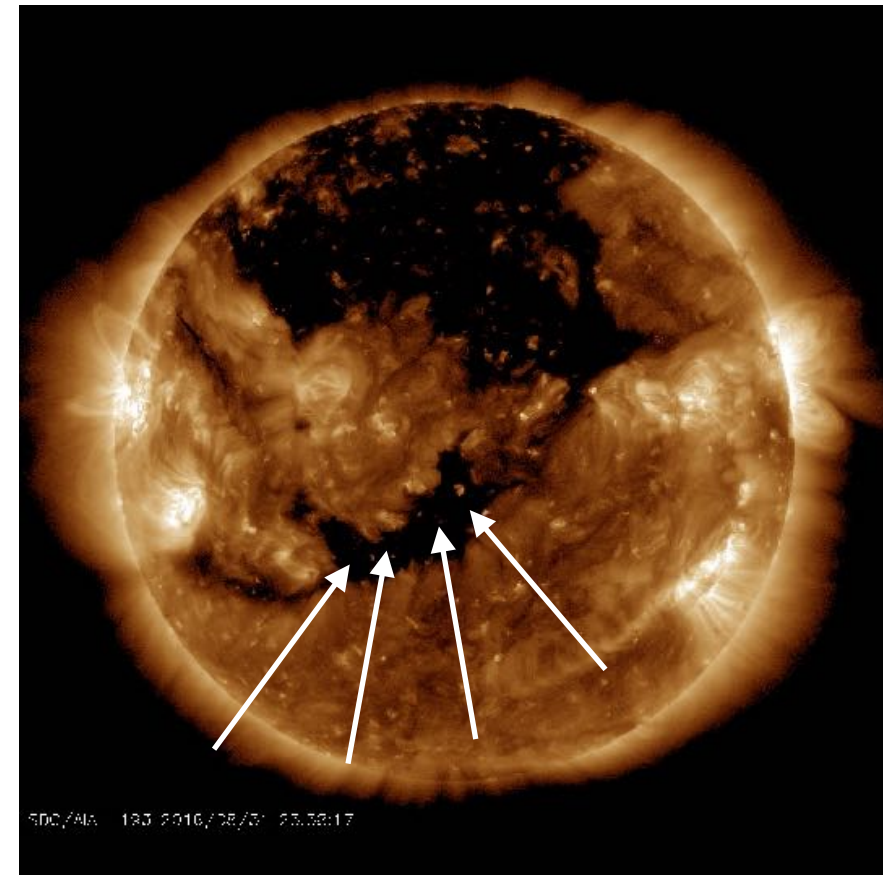
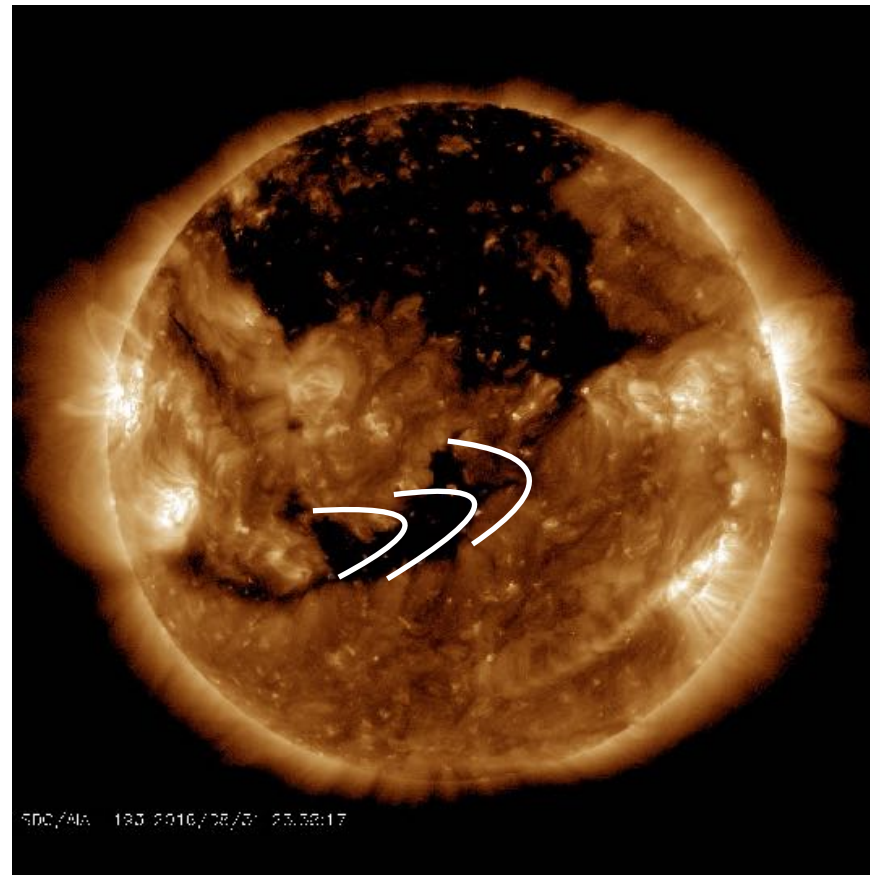
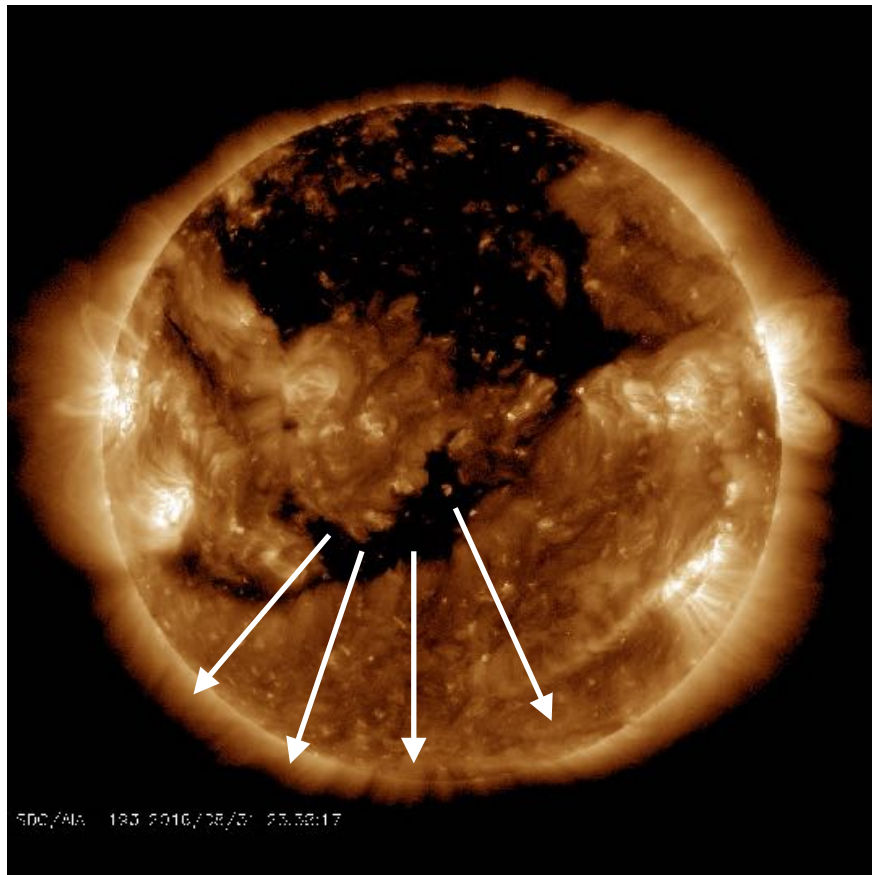
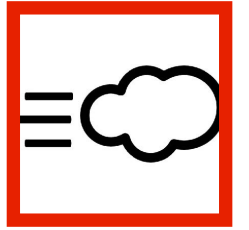
J.M.P., W. G. Wagner and H. Druckmüllerová

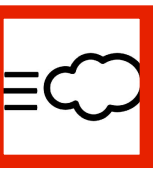


# CORONAL HOLE



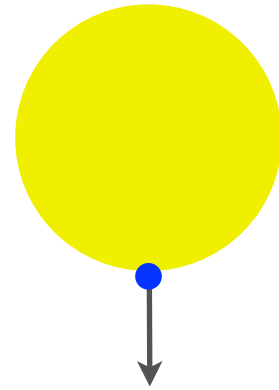
# B OF CORONAL HOLE



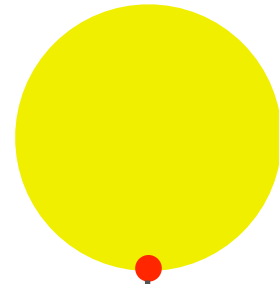
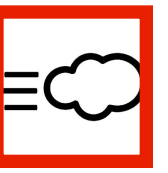


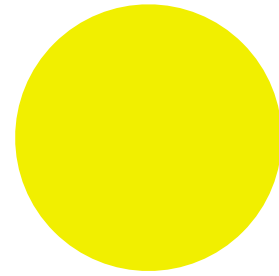
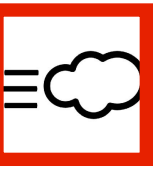
# WHAT HAPPENS WHEN FAST CATCHES SLOW?

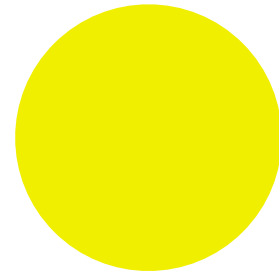
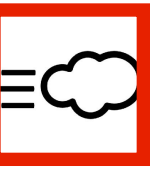
Top View





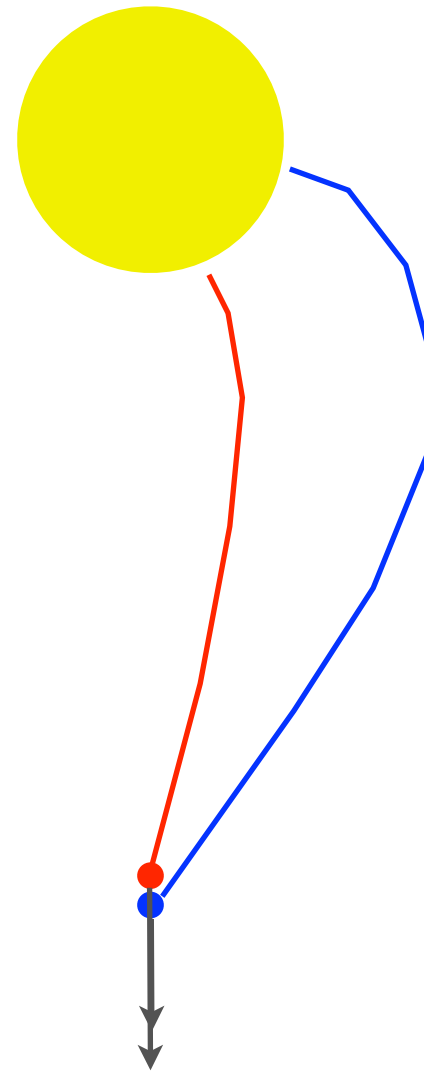
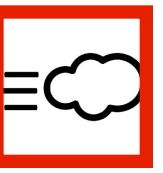






||



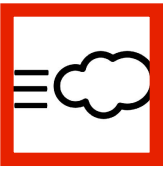


Interaction Region  
Rotates together with the Sun



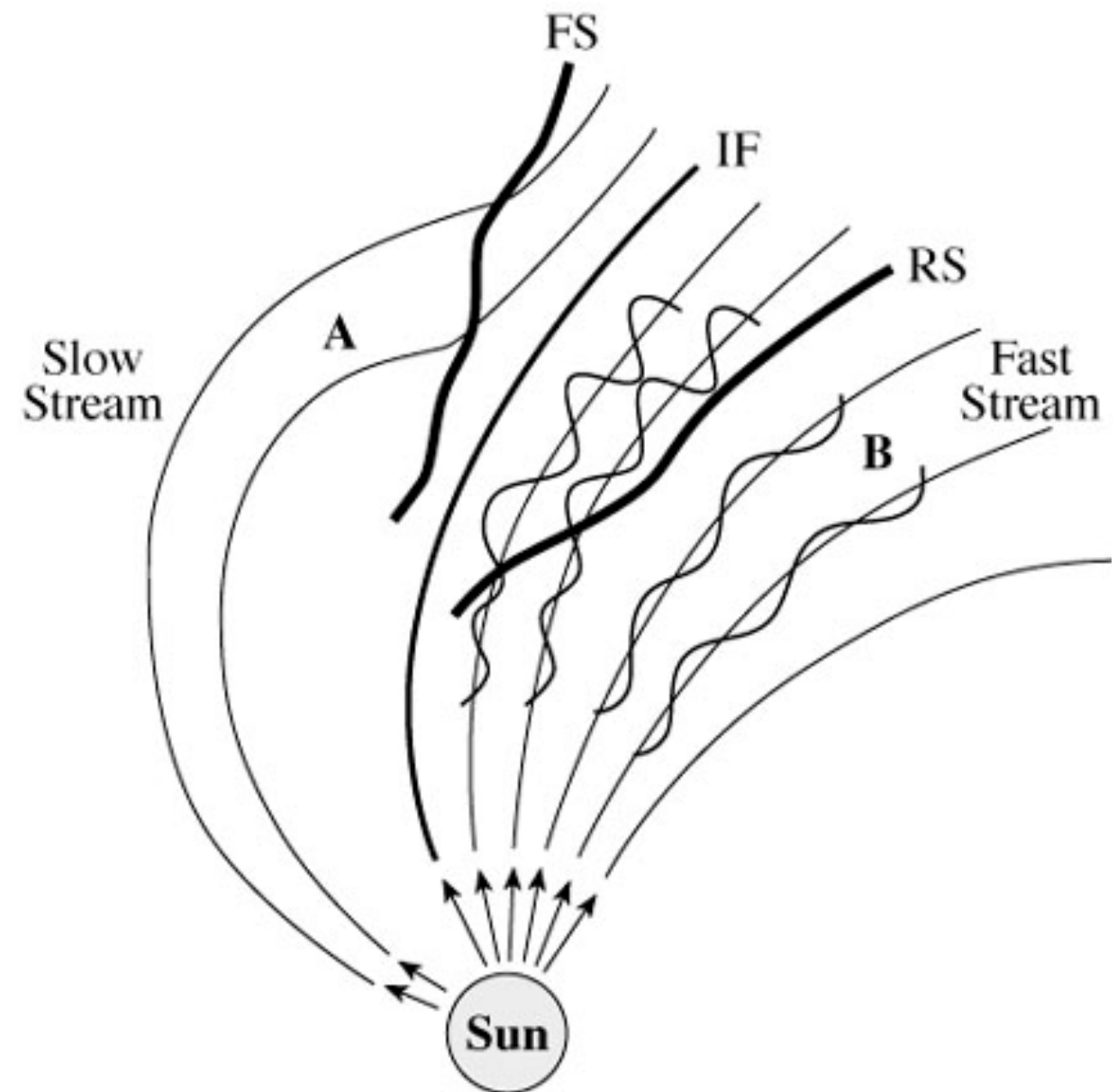
Co-rotating Interaction Region



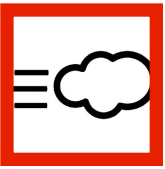


# Coronal Hole

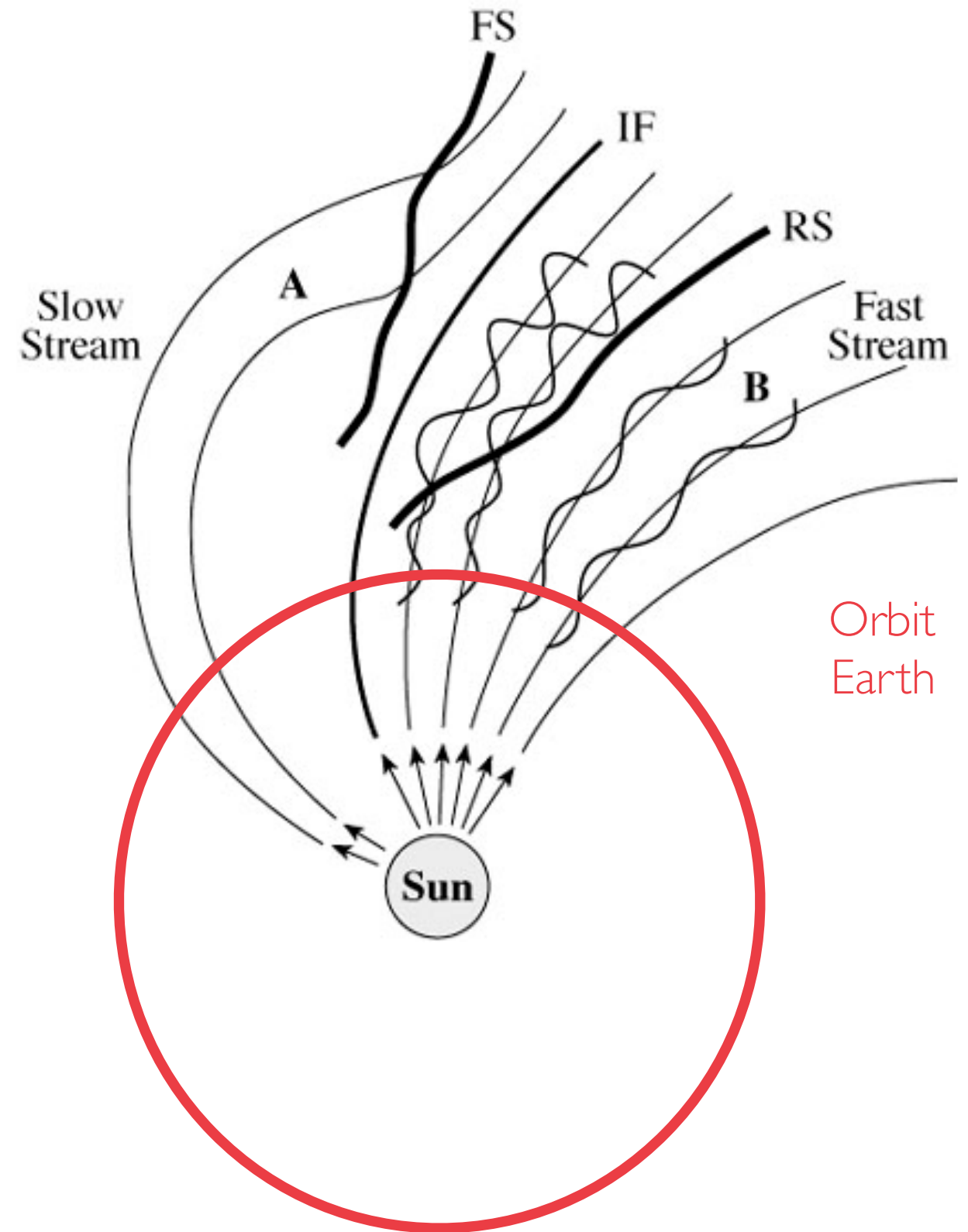
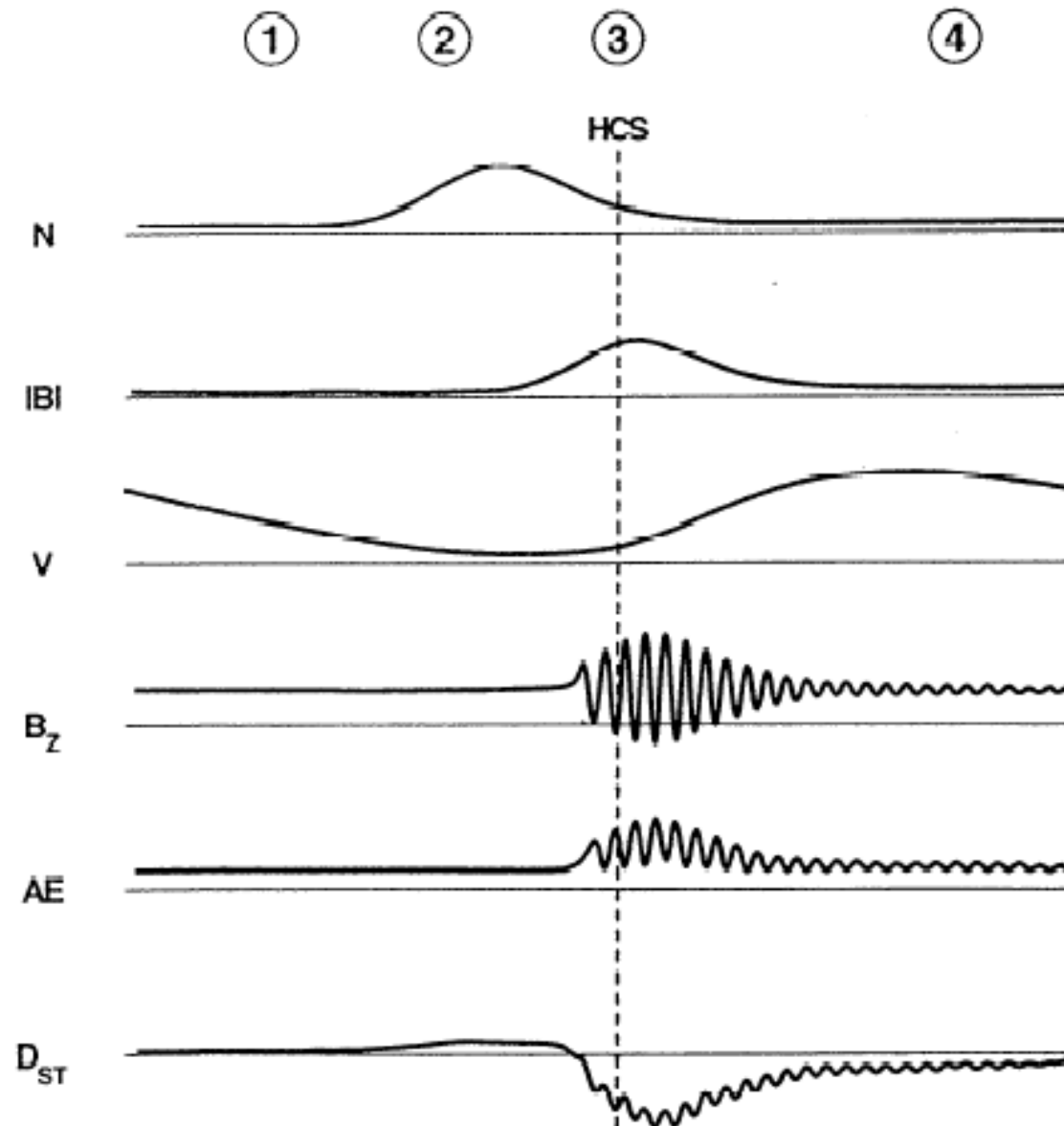
- Co-rotating structure
- Radial!
- No extra mass-flux

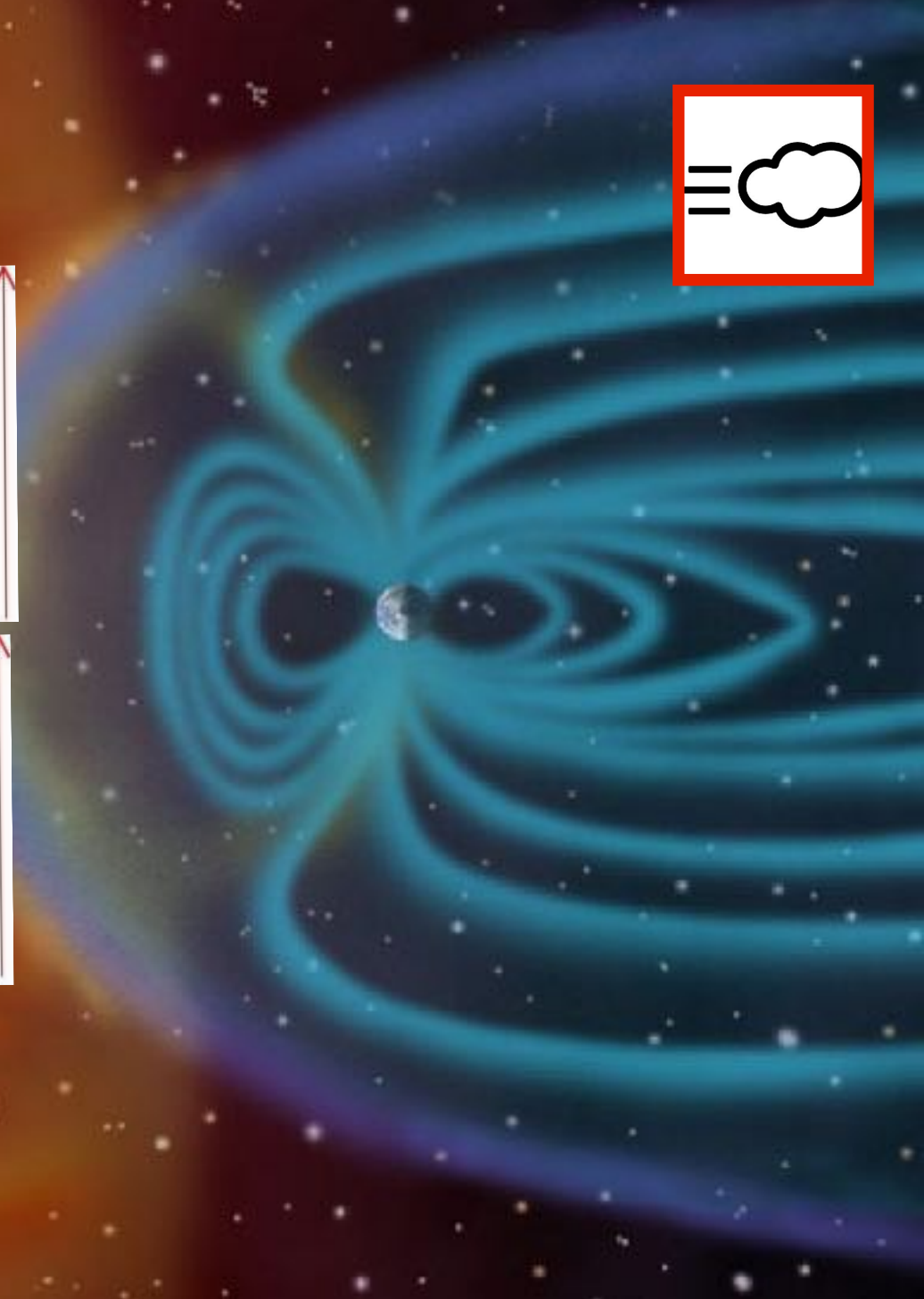
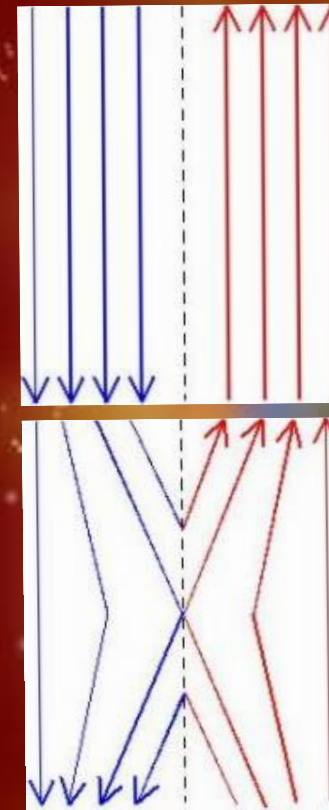
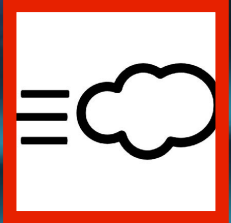
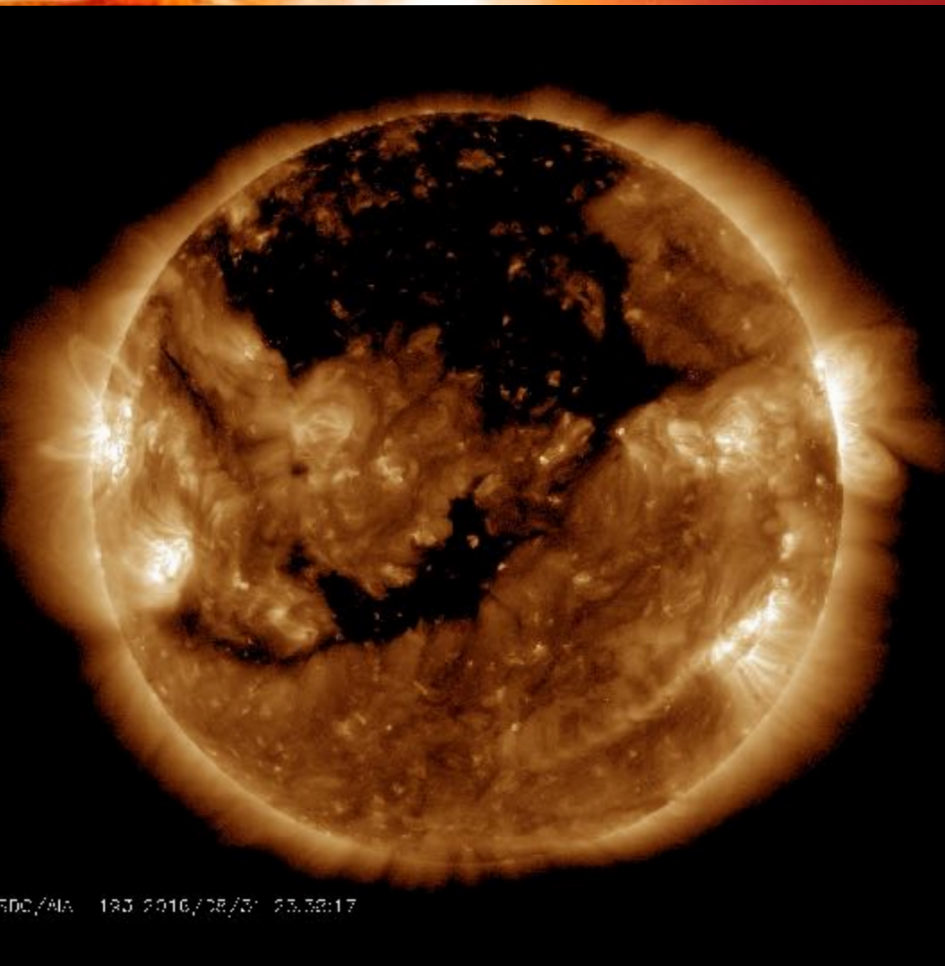






# Coronal Hole



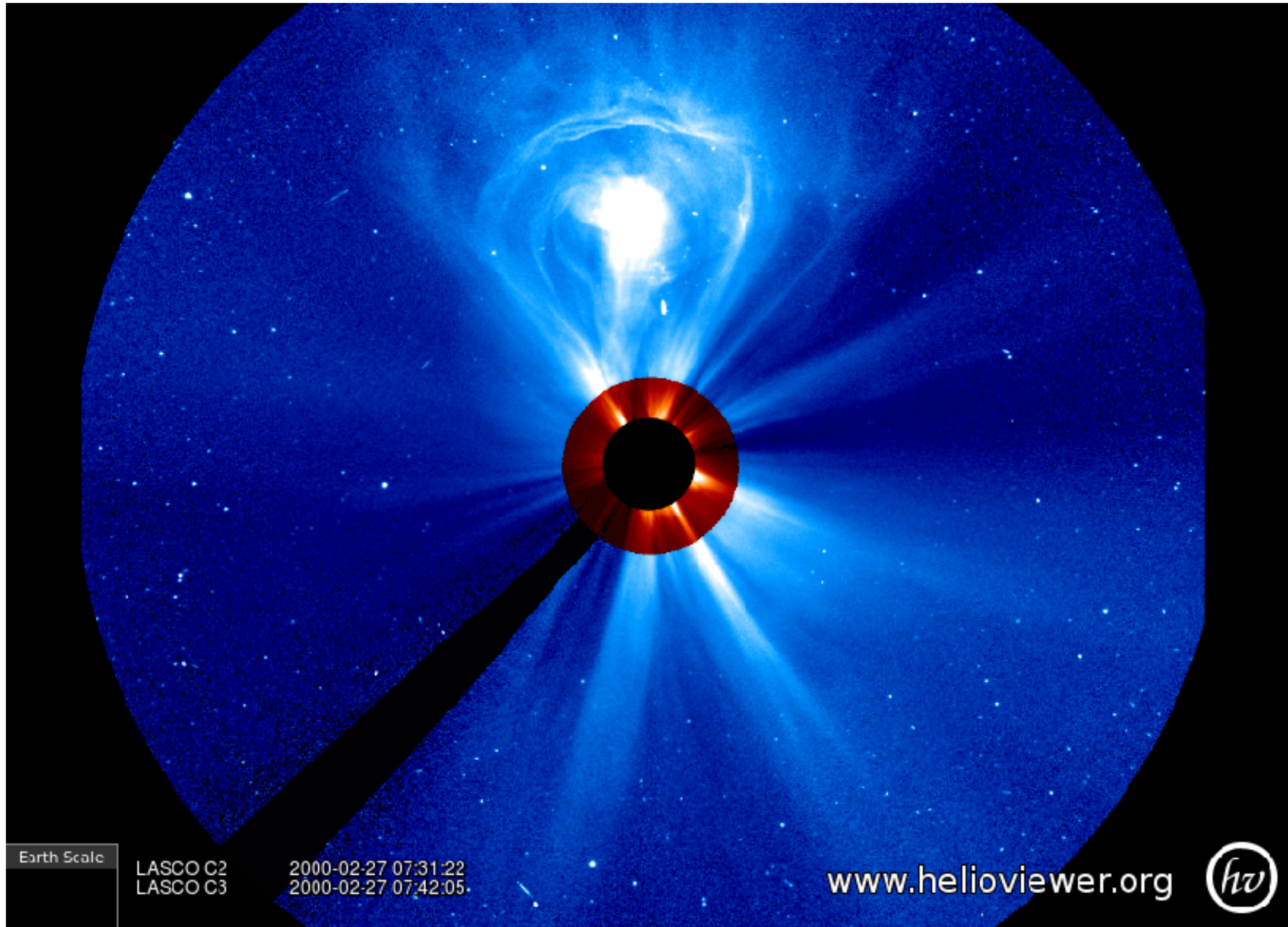
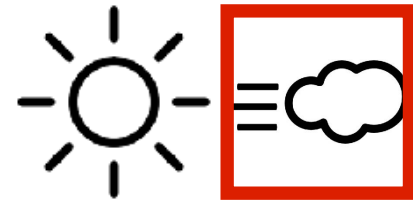


## RECONNECTION

The magnetic field carried by the solar wind can couple with the magnetic field of Earth. This coupling is stronger when the solar wind magnetic field is opposite to the magnetic field of Earth.



# CORONAL MASS EJECTION



Earth Scale

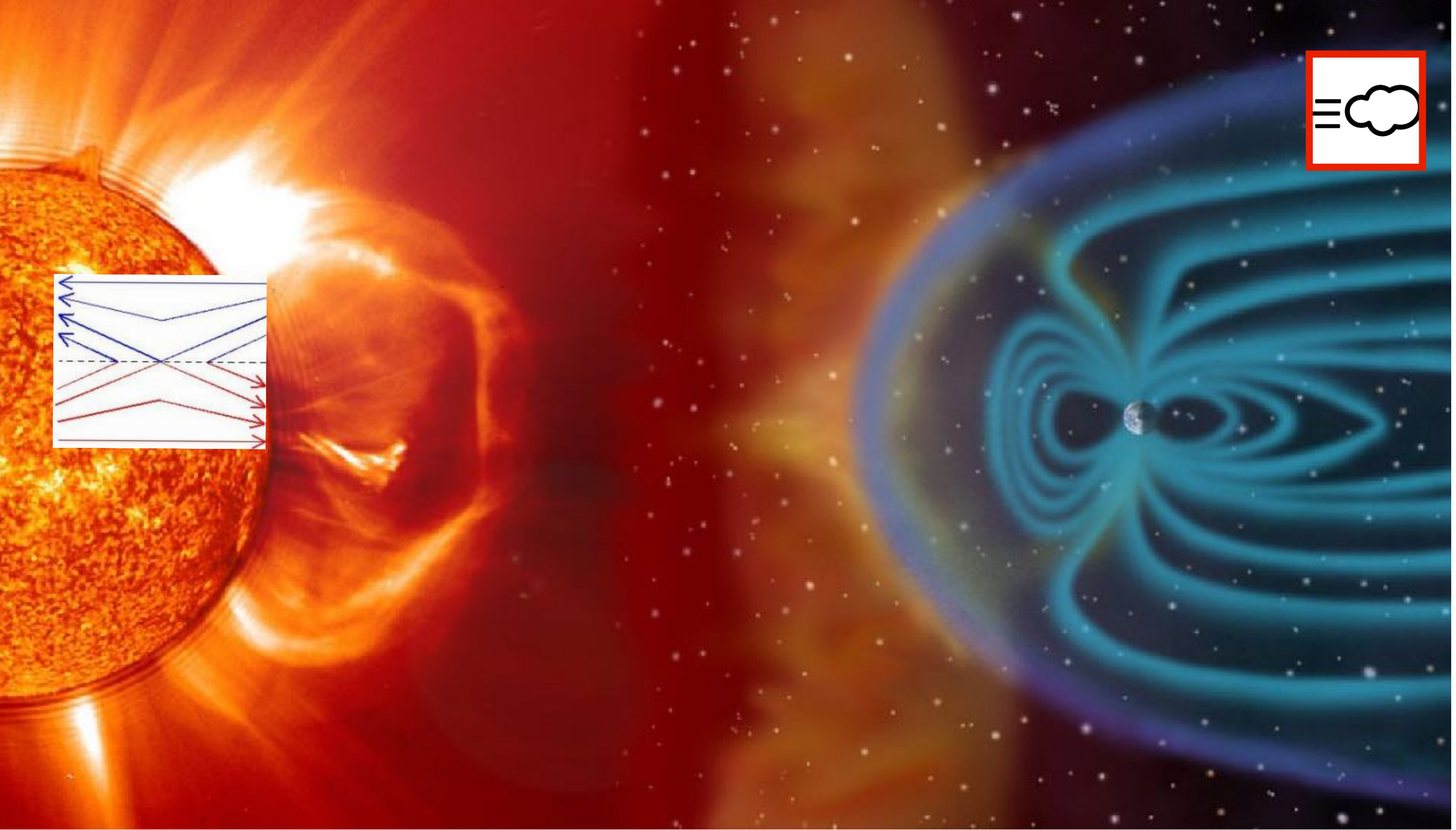
LASCO C2  
LASCO C3

2000-02-27 07:31:22  
2000-02-27 07:42:05

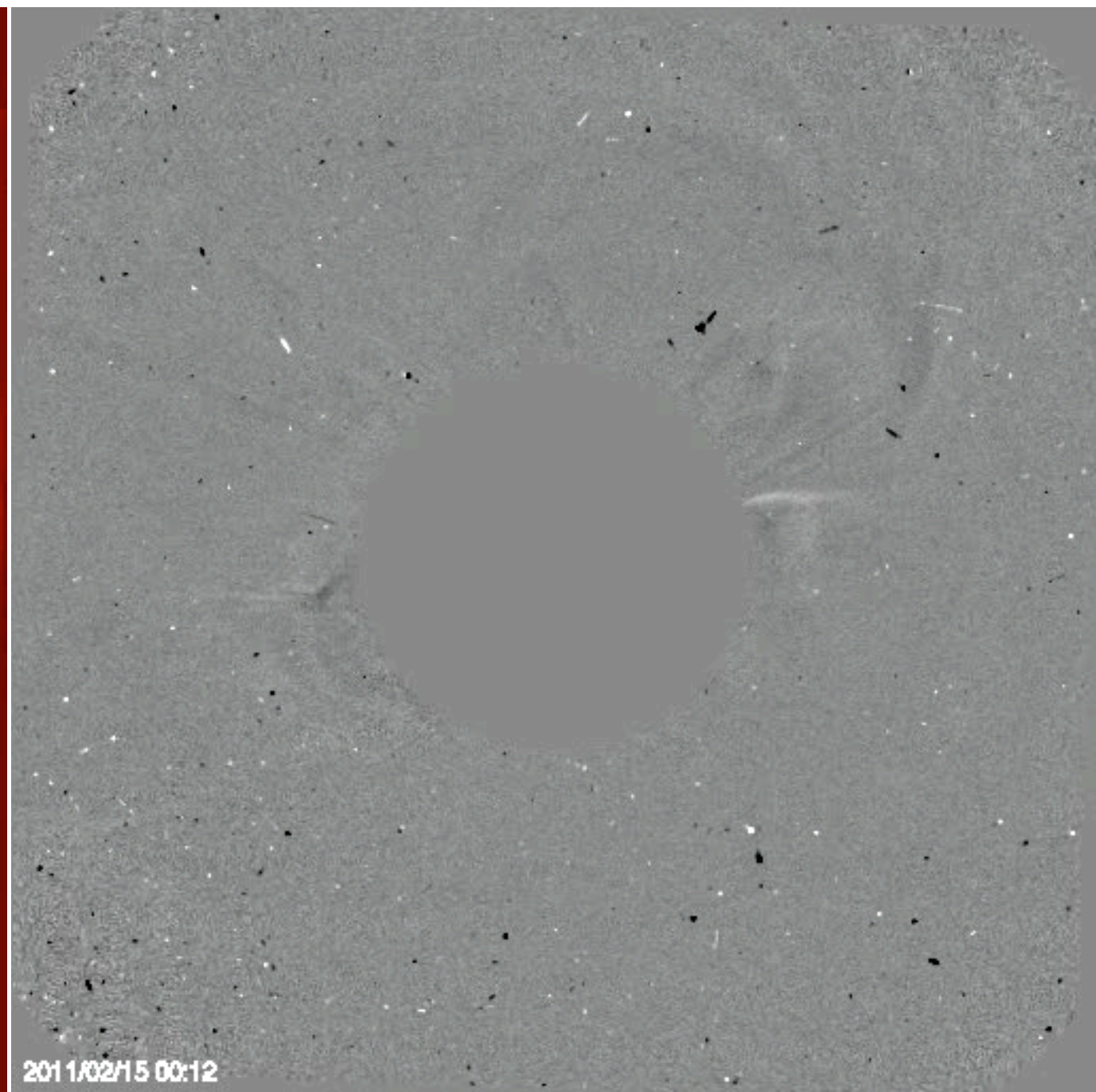
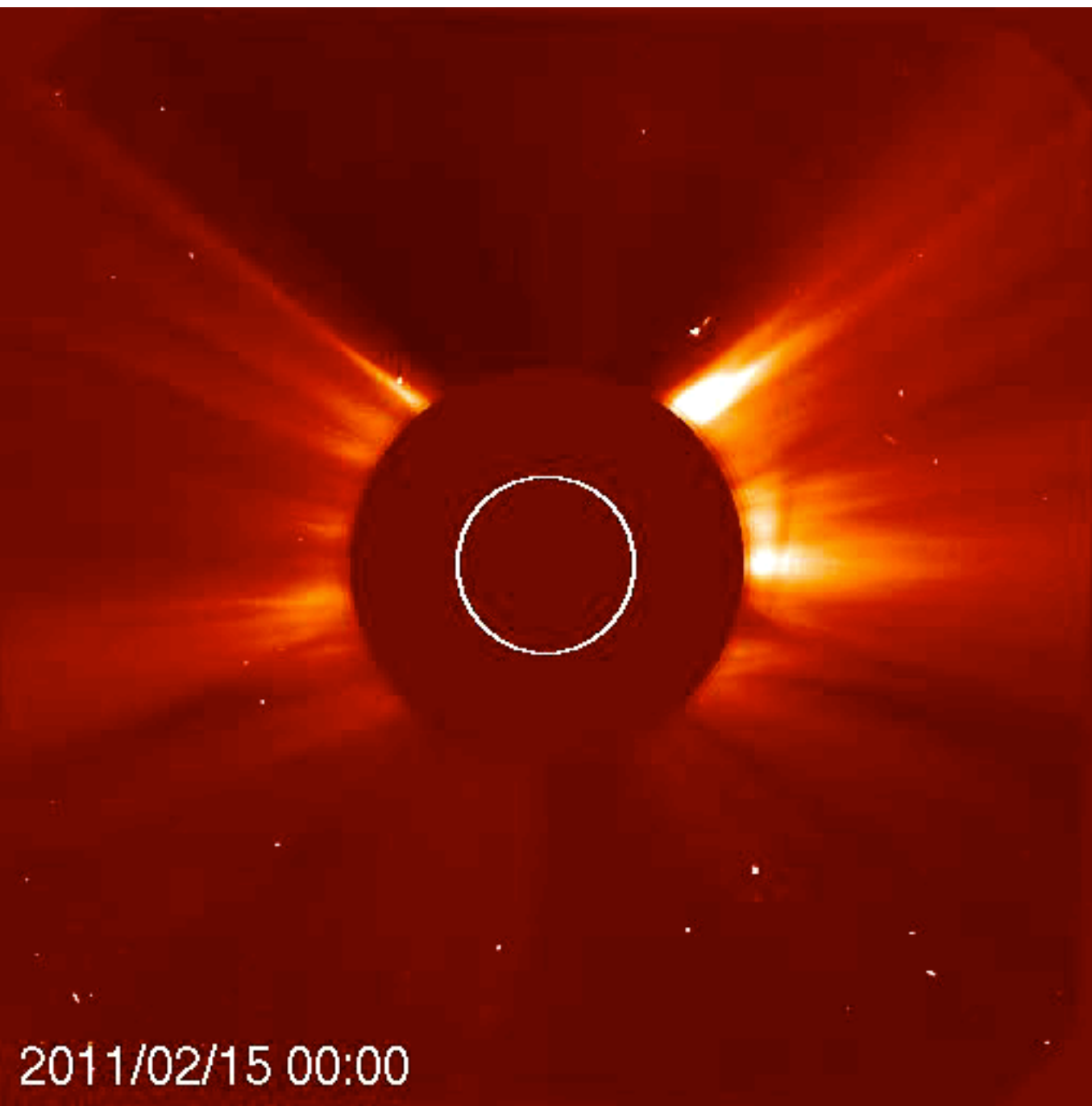
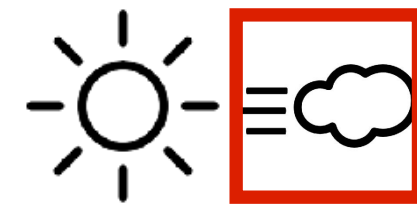
[www.helioviewer.org](http://www.helioviewer.org)











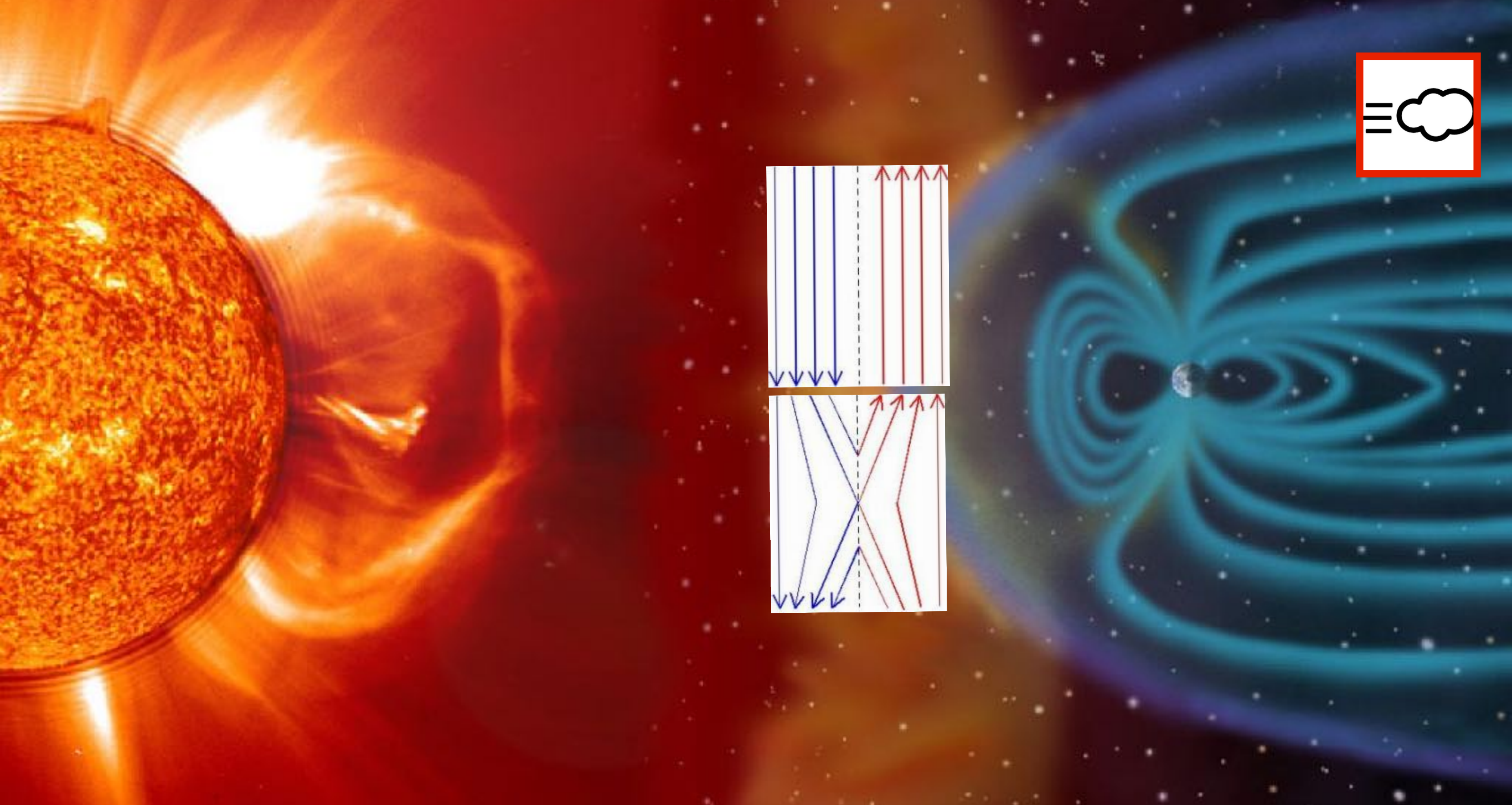
SOHO / LASCO c2



running difference



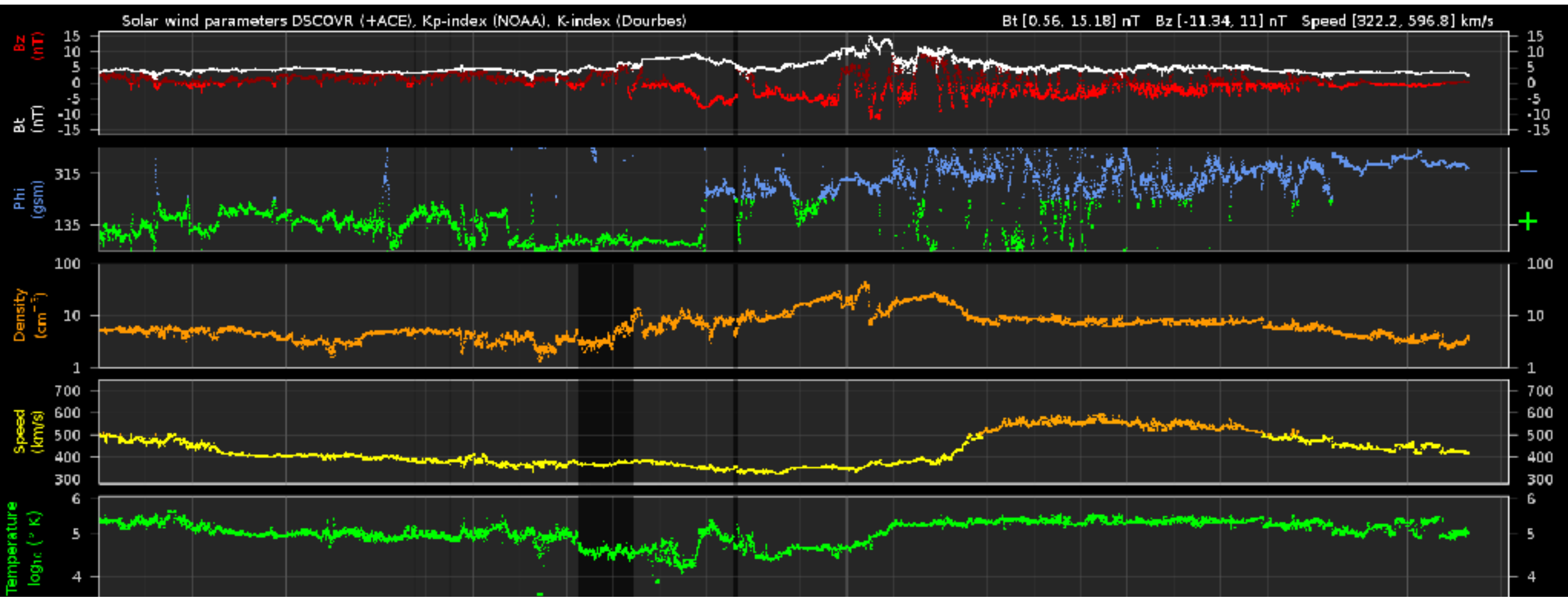




## RECONNECTION

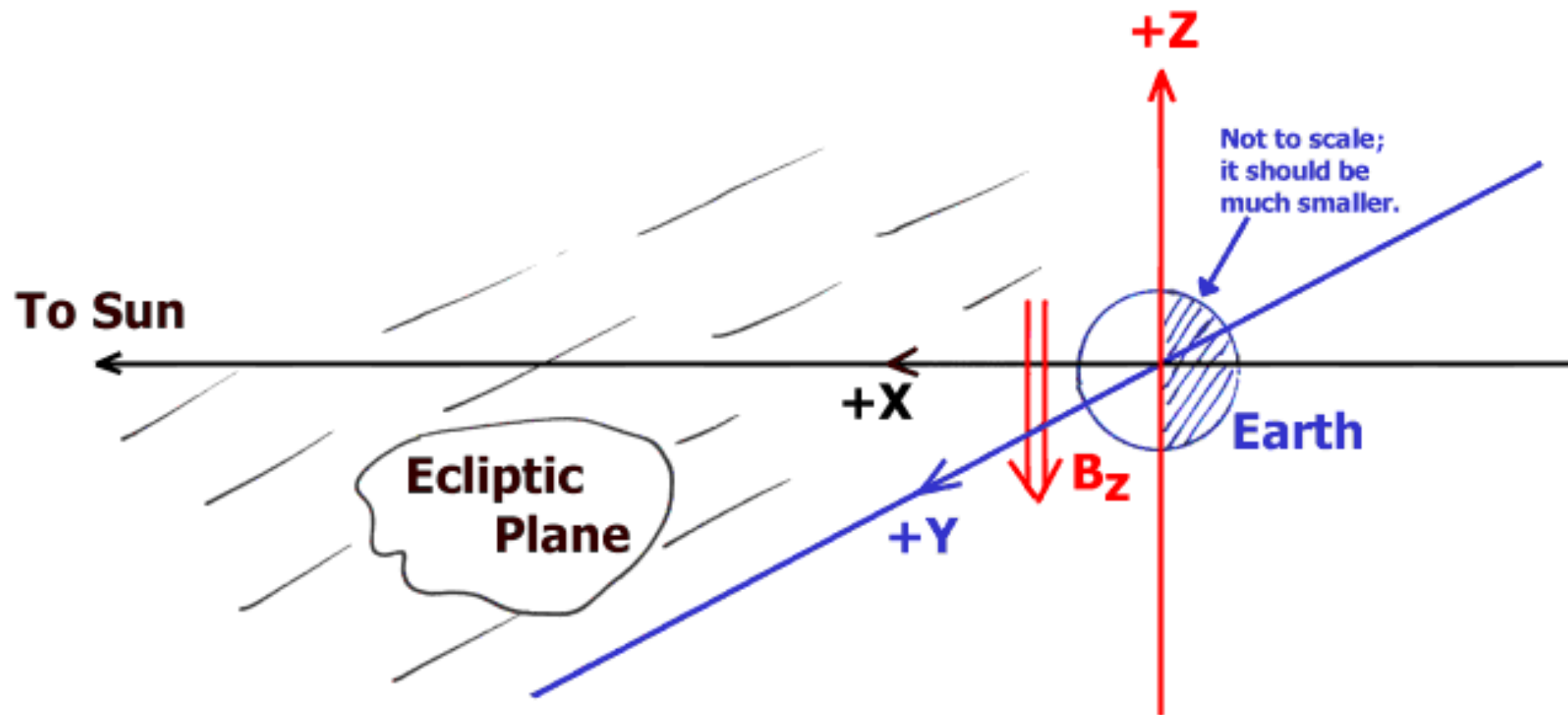
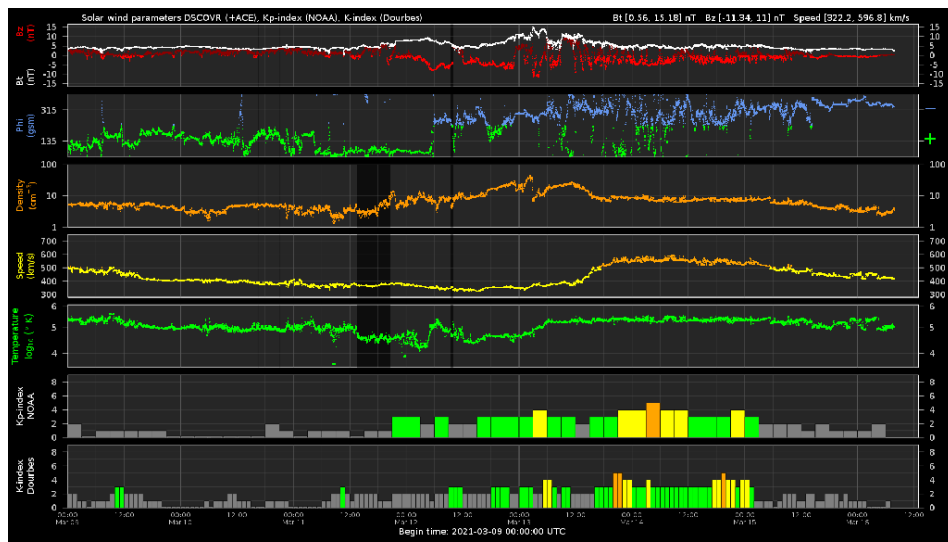
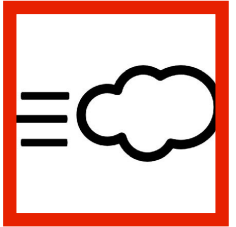
The magnetic field carried by the solar wind can couple with the magnetic field of Earth. This coupling is stronger when the solar wind magnetic field is opposite to the magnetic field of Earth.





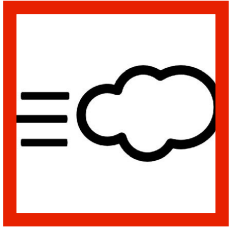
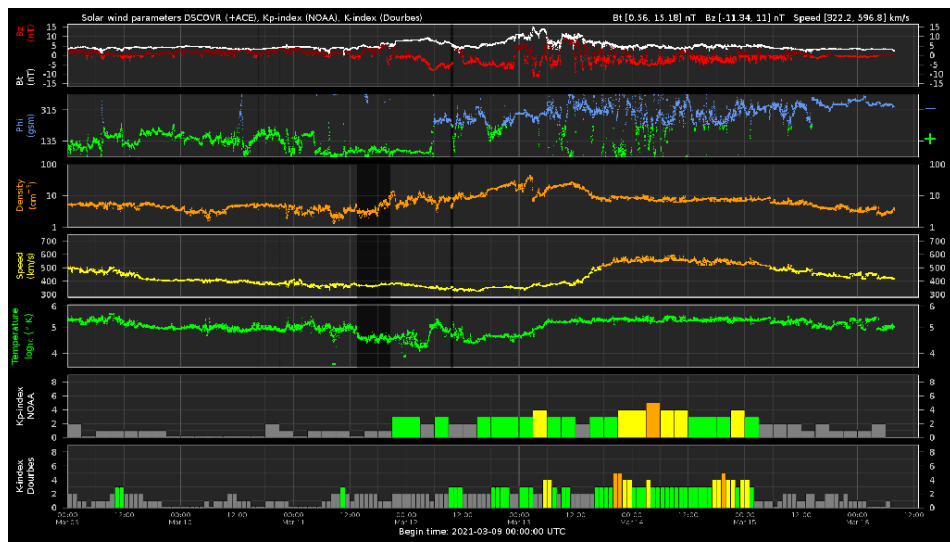
**DSCOVR**

# COORDINATE SYSTEM

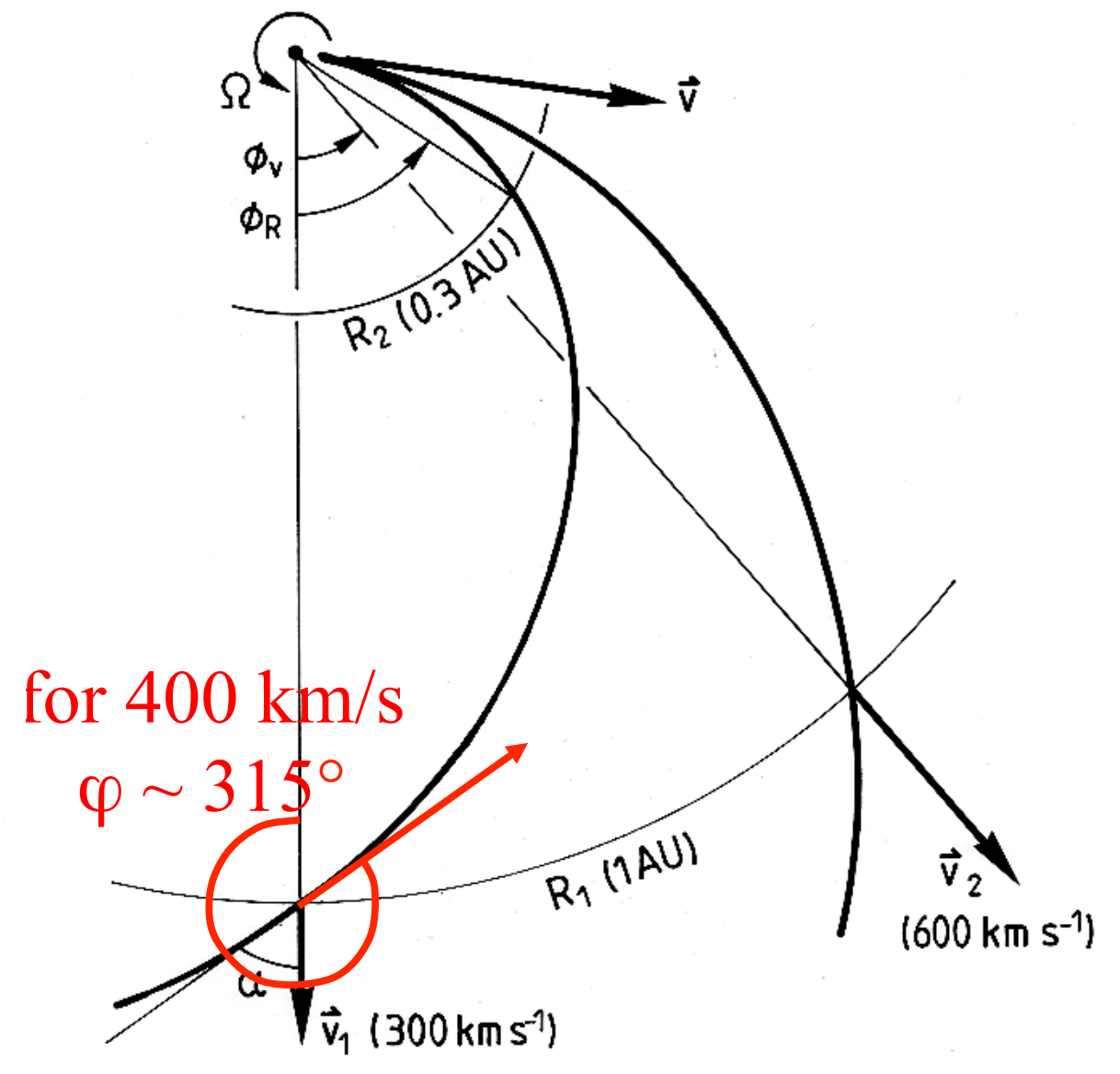
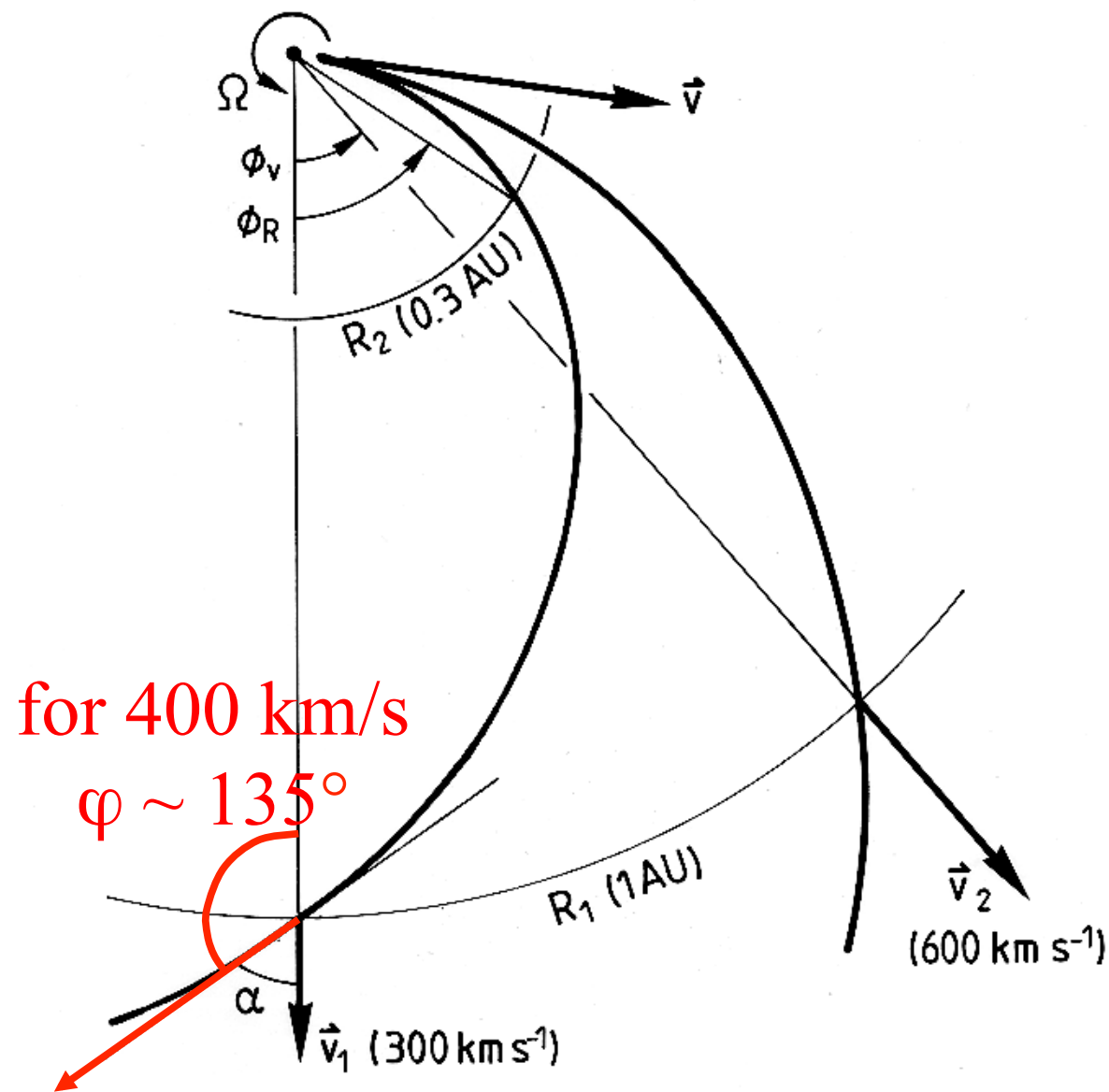


**+Z is perpendicular to the Ecliptic Plane.**

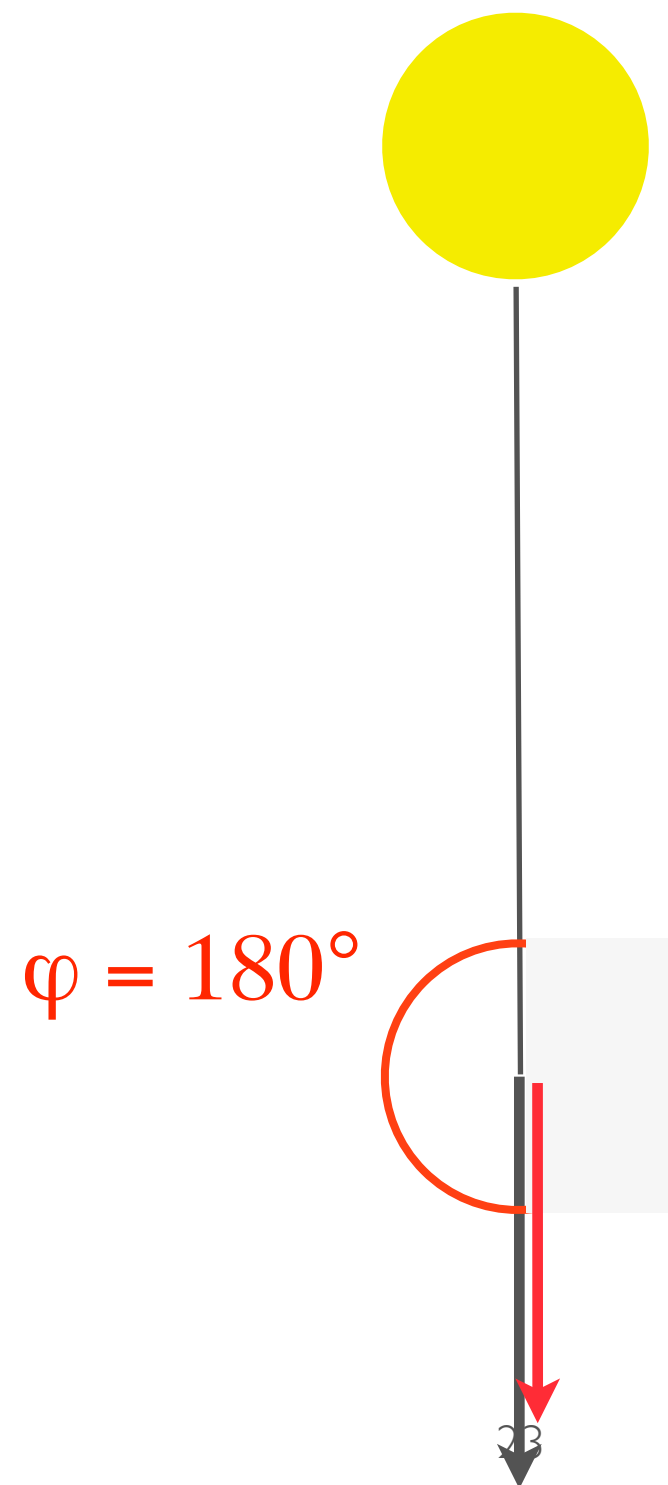
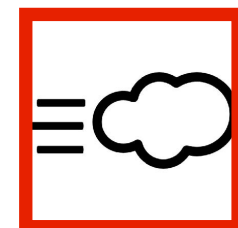




# IMF POLARITY

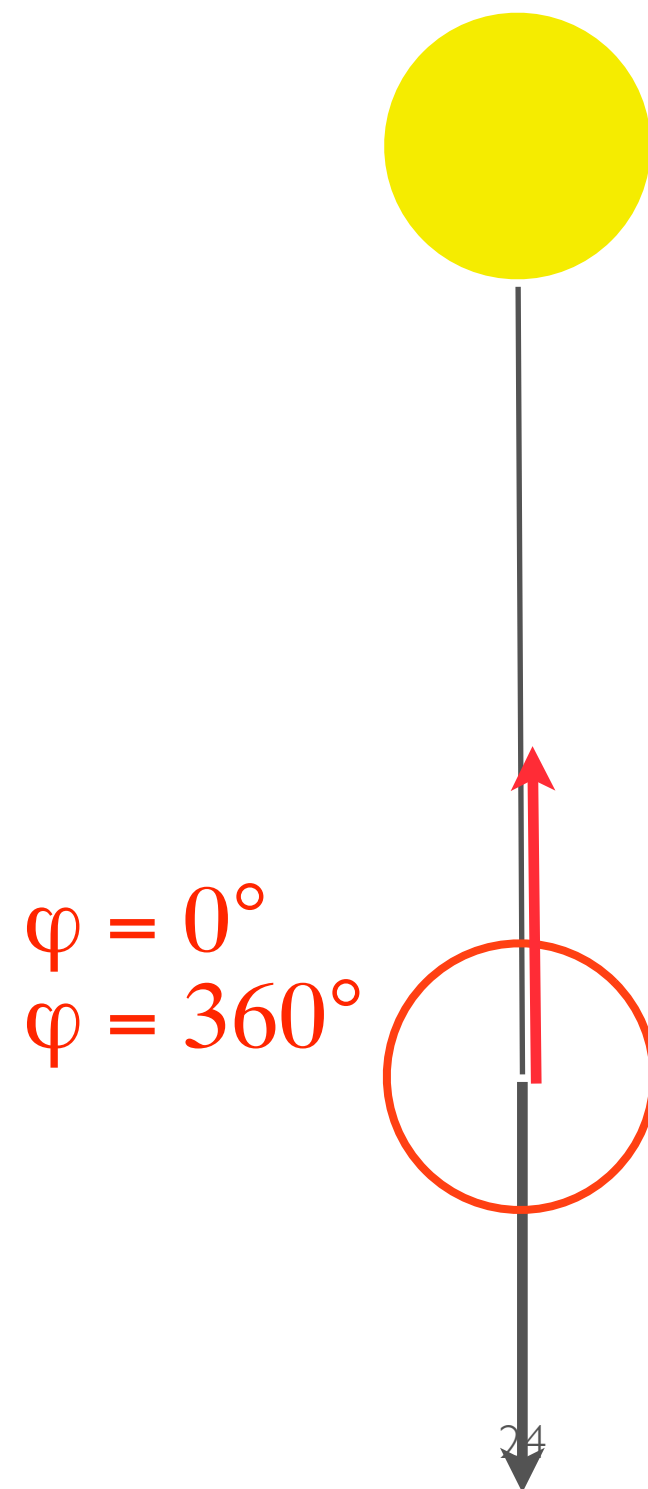
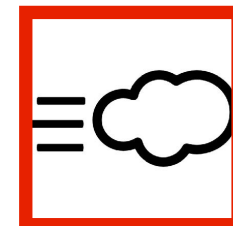


# EXTREME FAST

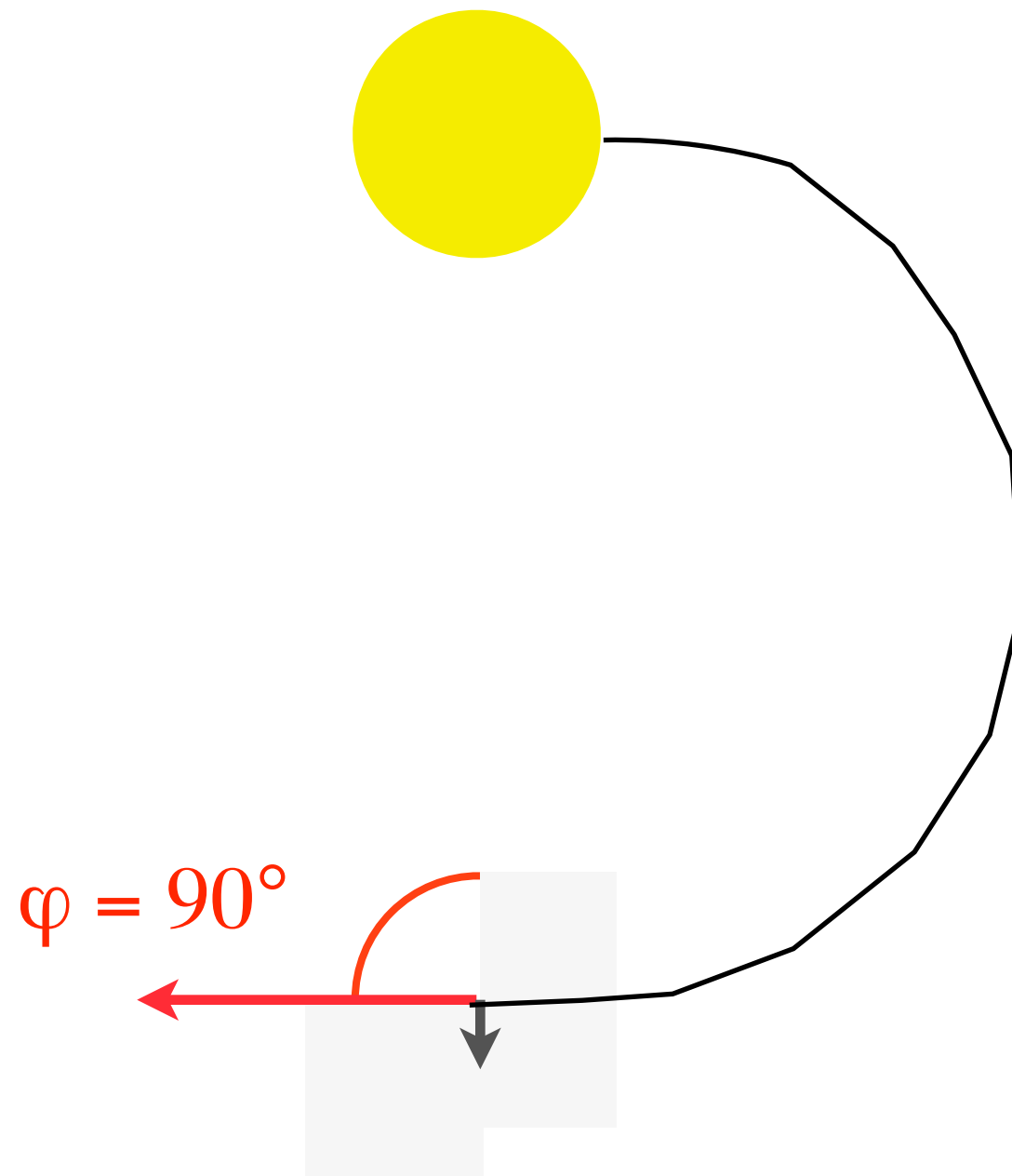




# EXTREME FAST



# EXTREME SLOW



Central Meridian

Solar rotation axis

Solar North Pole

Magnetic South Pole  
positive/outward  
yellow/white

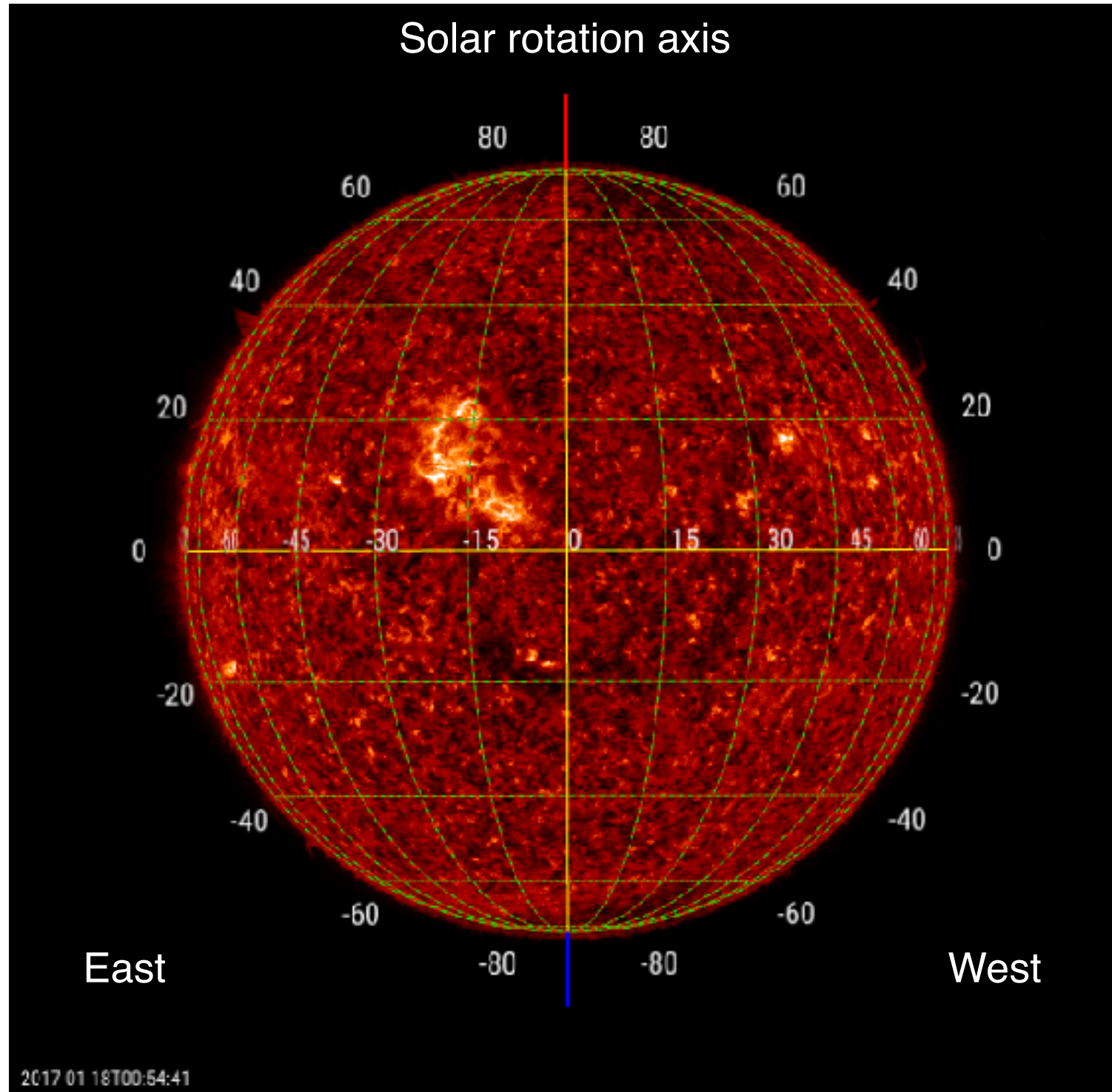
Northern hemisphere

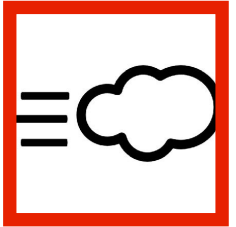
Solar South Pole

Magnetic North Pole  
negative/inward  
blue/black

Solar Equator

Southern hemisphere

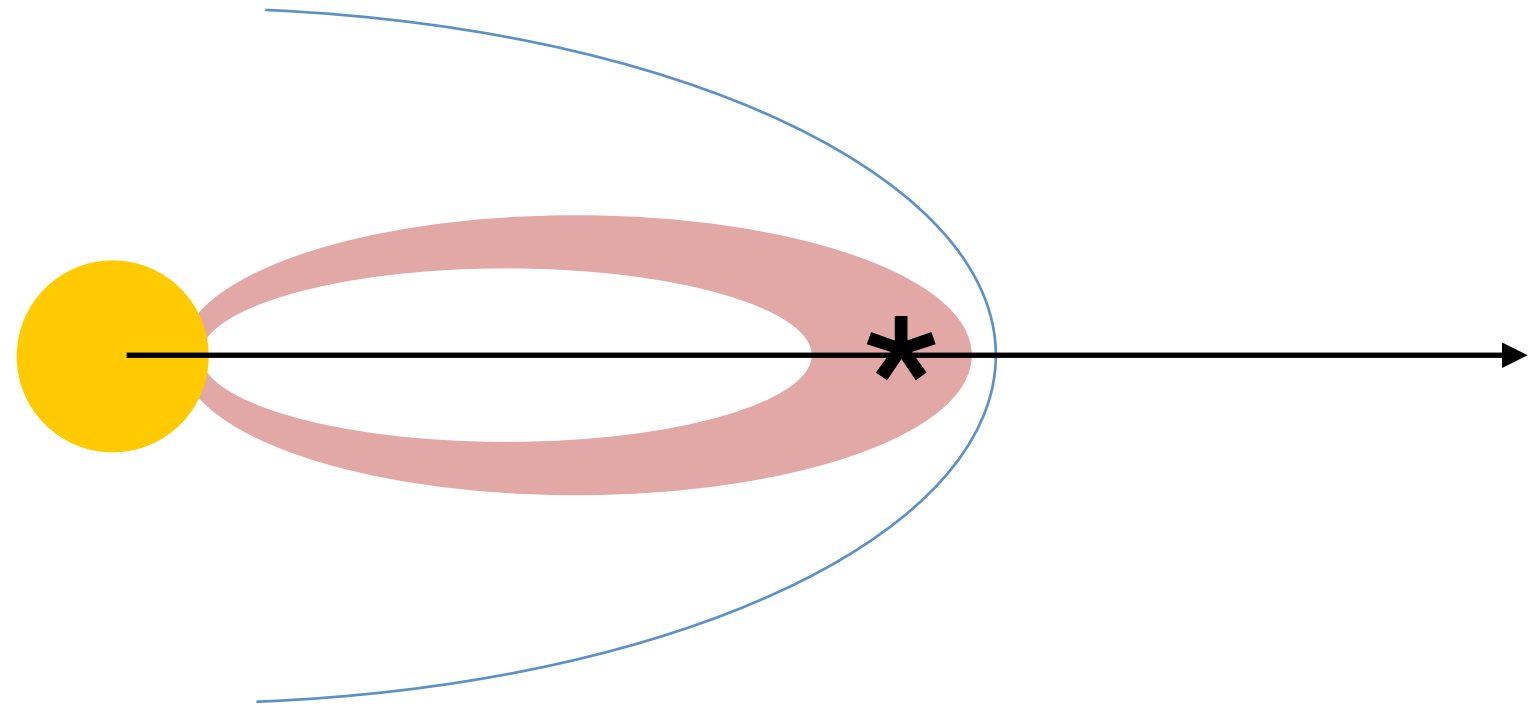




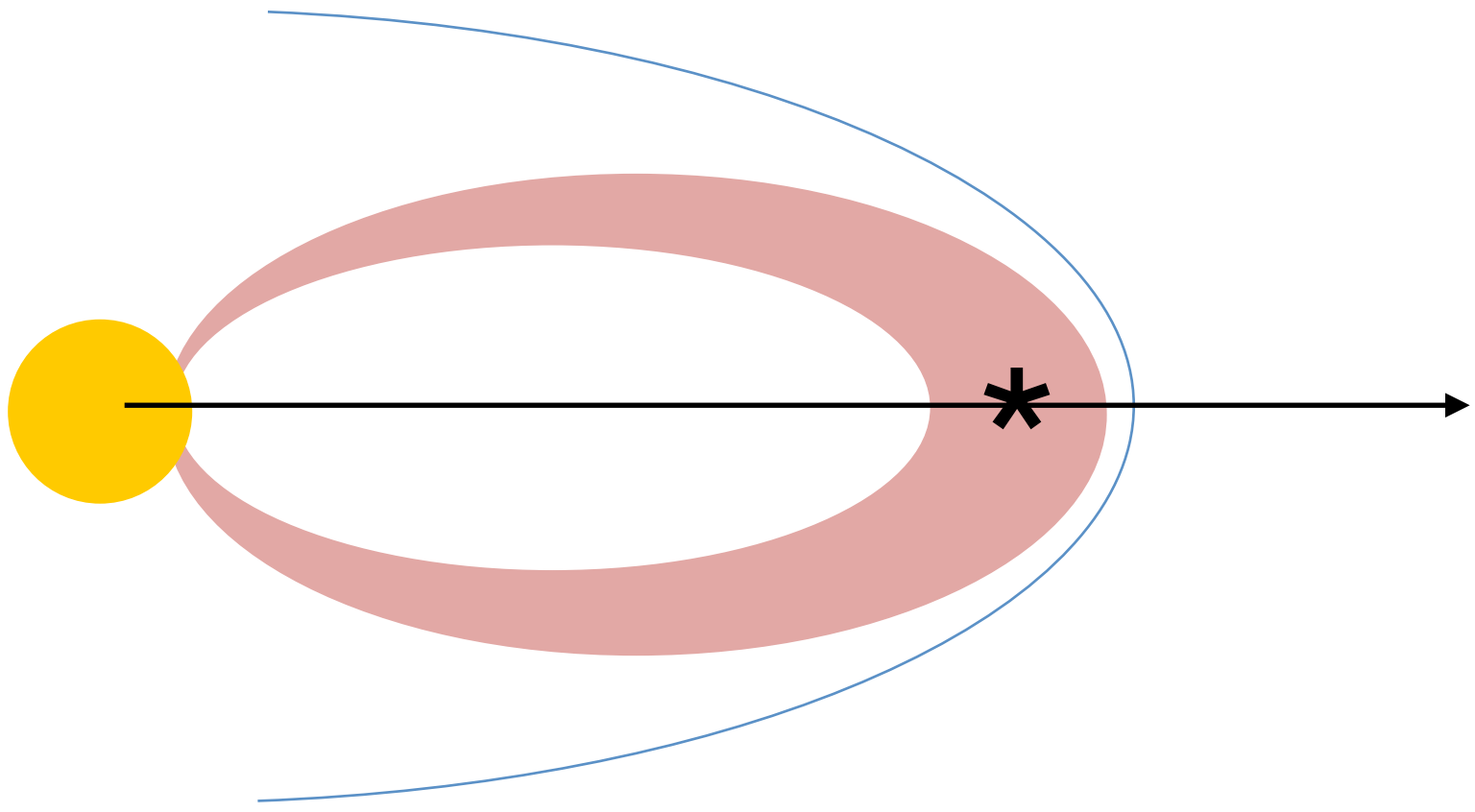
Beacon COR2 CME speed calculator

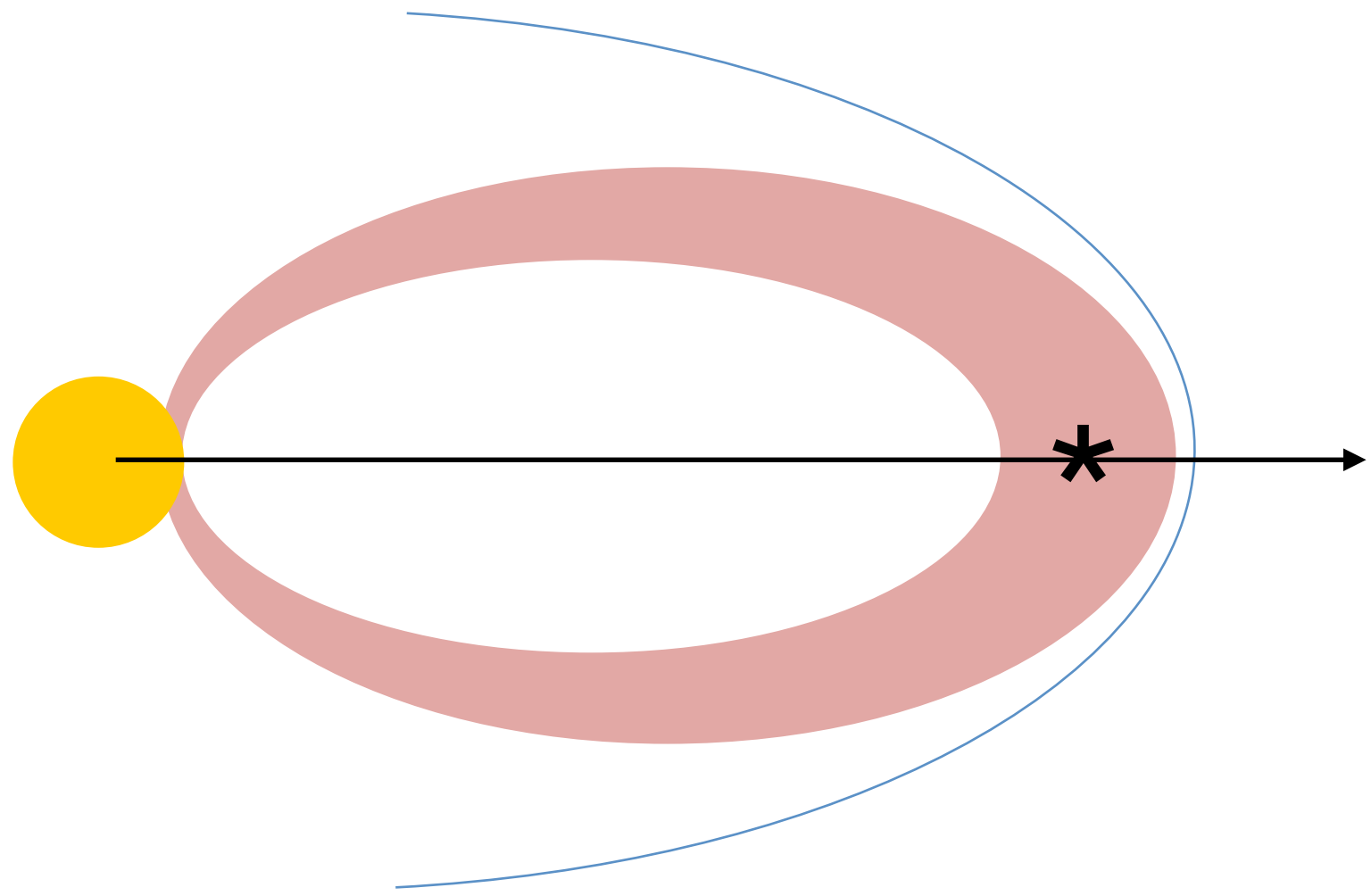
<https://www.sidc.be/cactus/>

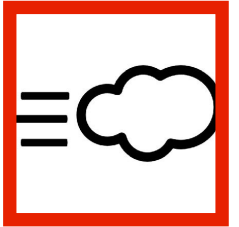












# Exercices

<https://www.stce.be/presentations/SWIC2021/>

