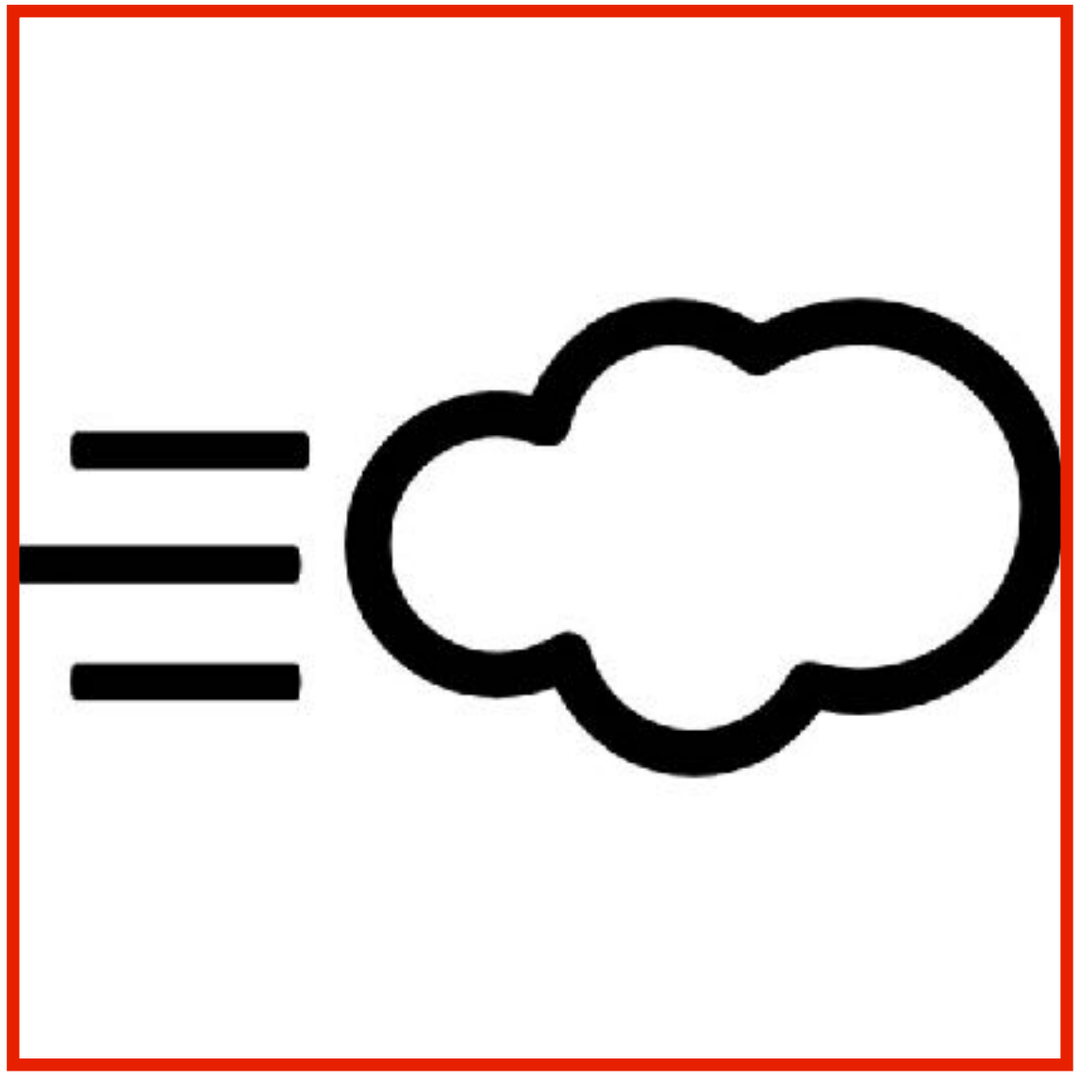


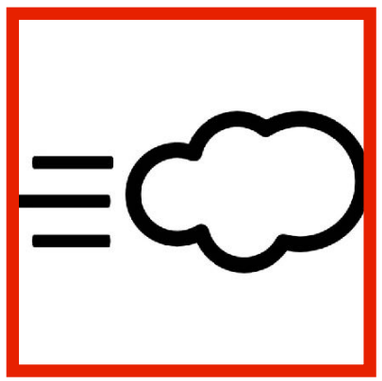
SOLAR WIND

Exercises

Petra Vanlommel

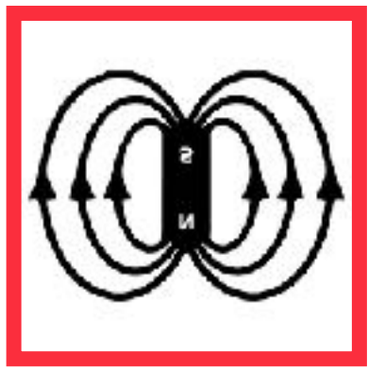
SDO/AIA

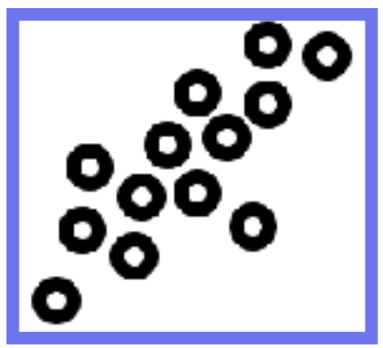
GOES



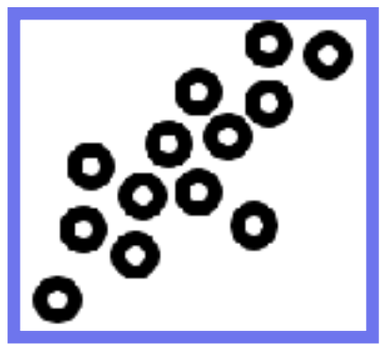
SOHO/LASCO

ACE
DSCOVR



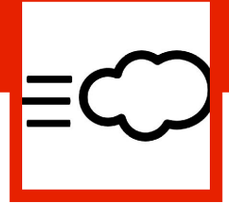


SOHO/LASCO



GOES

SOLAR WIND



Interplanetary Magnetic Field

+

Plasma

INTERPLANETARY MAGNETIC FIELD + PLASMA

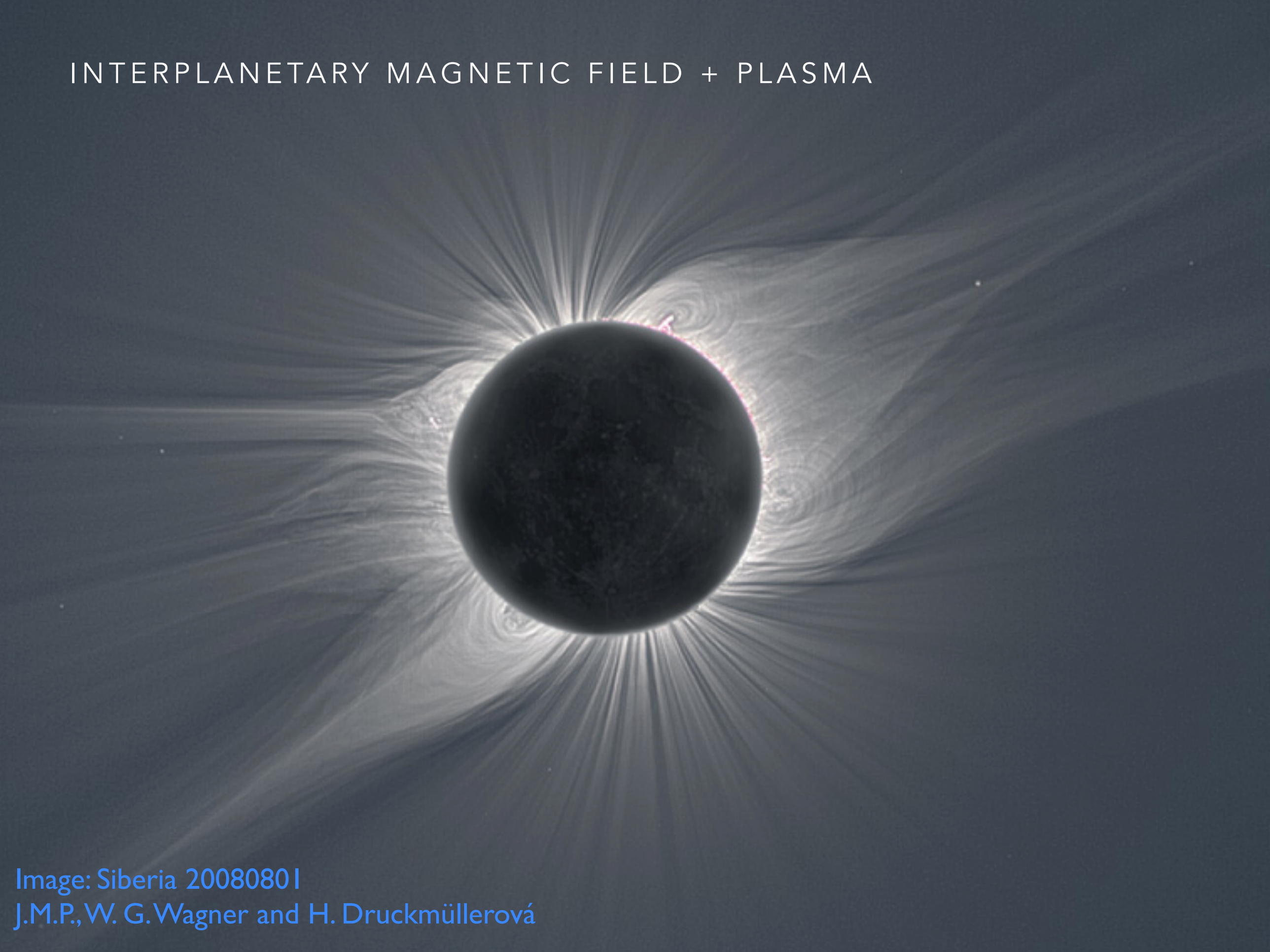
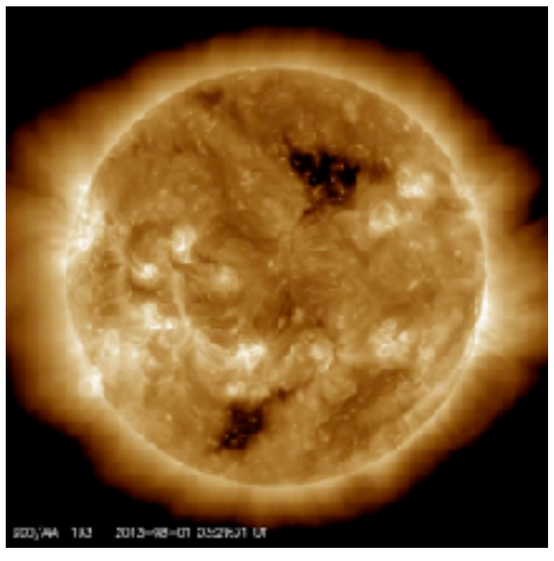


Image: Siberia 20080801
J.M.P., W. G. Wagner and H. Druckmüllerová

SOLAR WIND DISTURBANCES

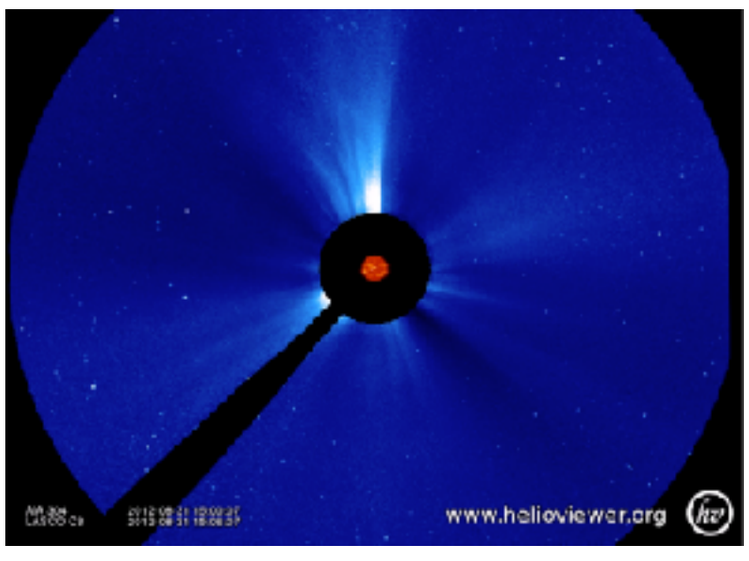
Non-eruptive

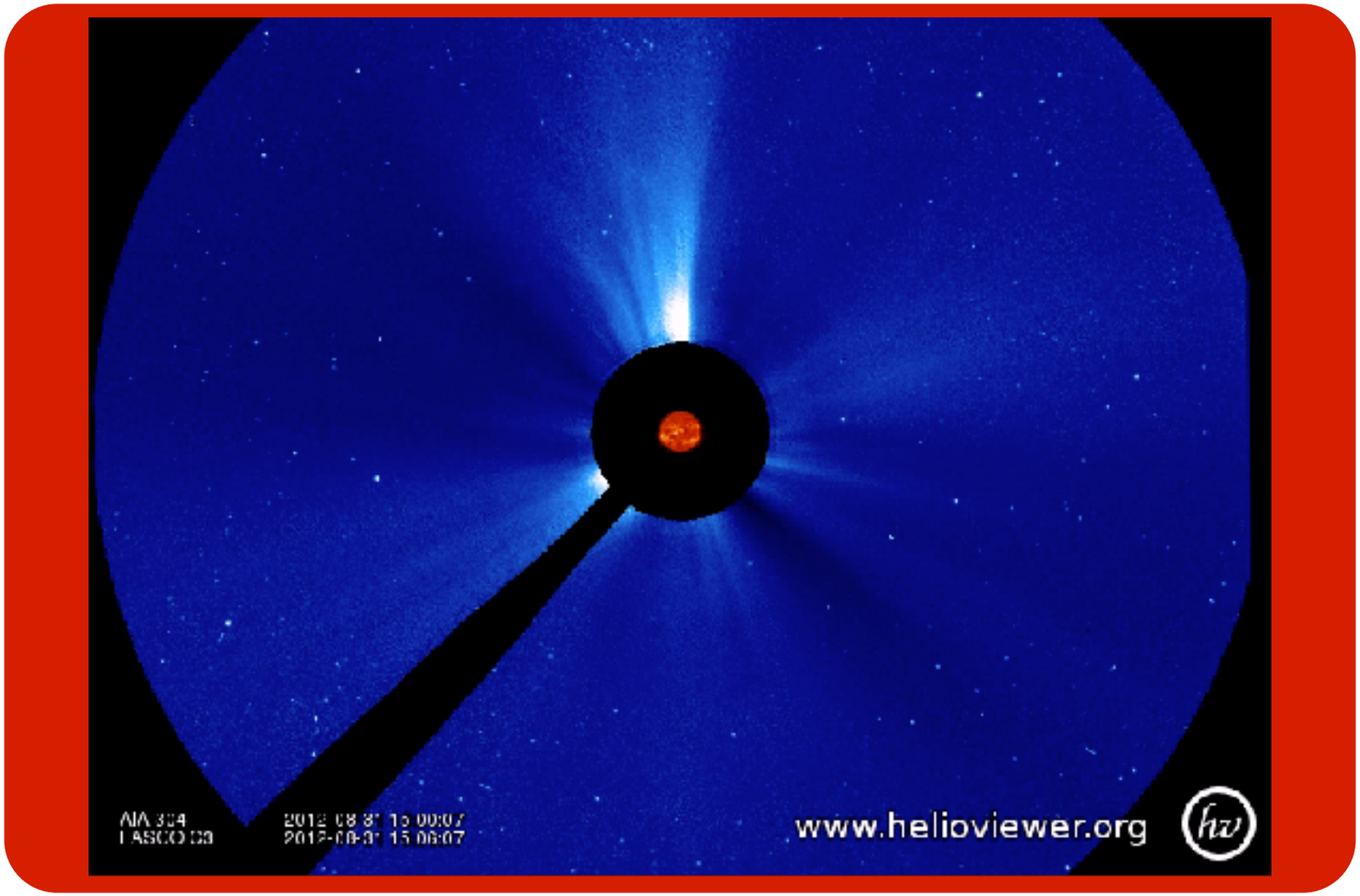
Coronal Hole



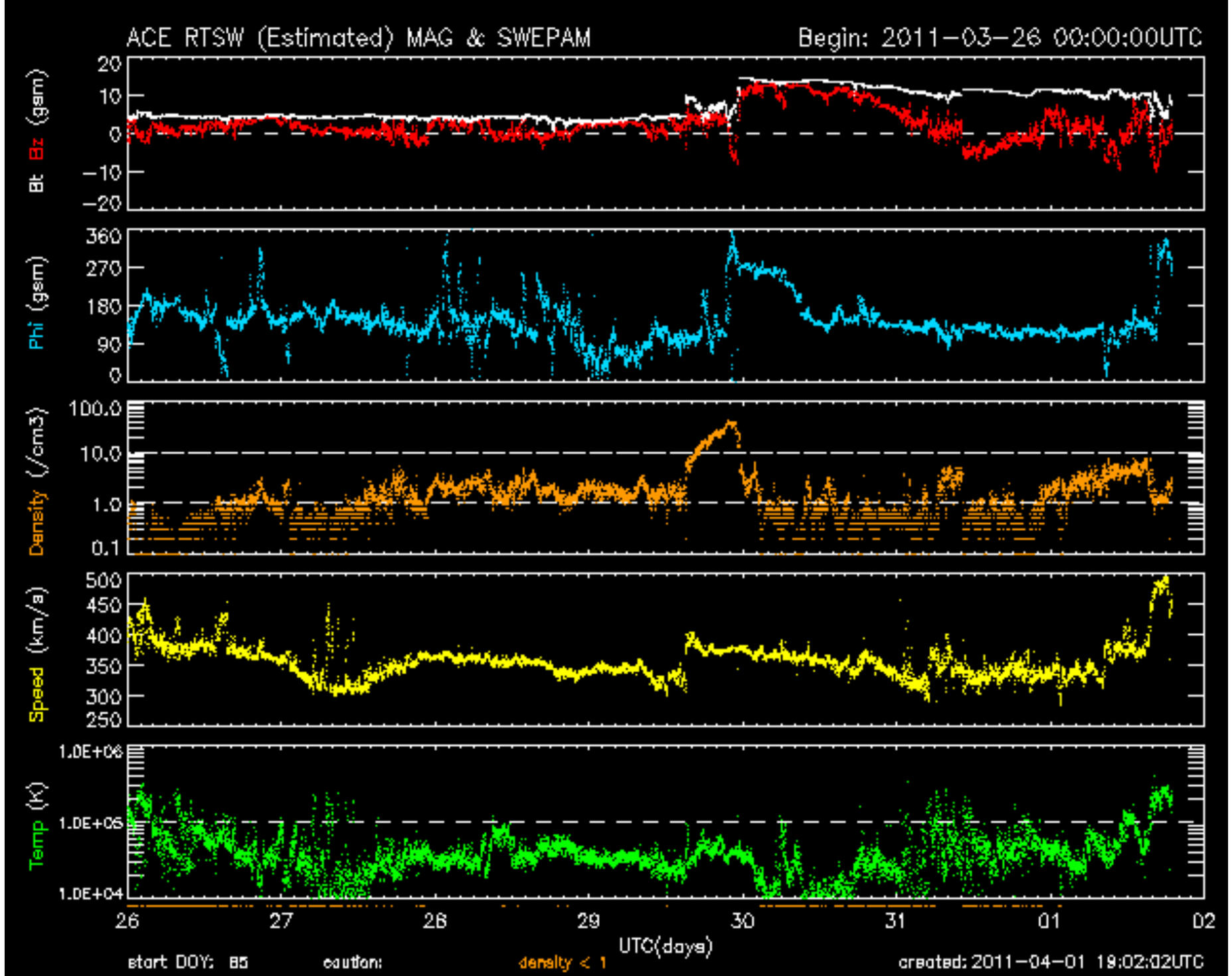
Eruptive

Coronal Mass Ejection

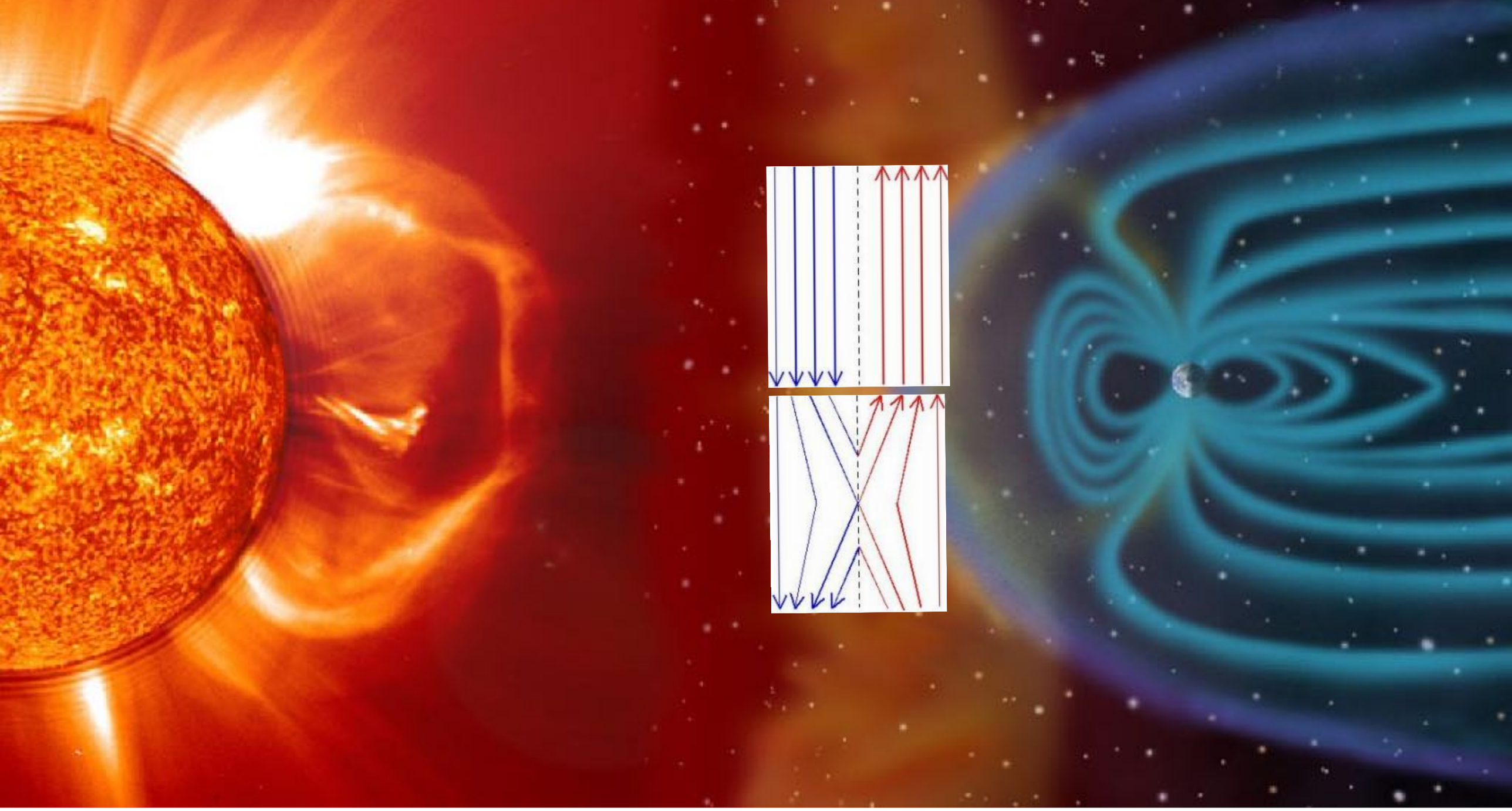




A new, discrete, bright white light feature in the coronograph field-of-view with a predominantly, radial outward velocity.



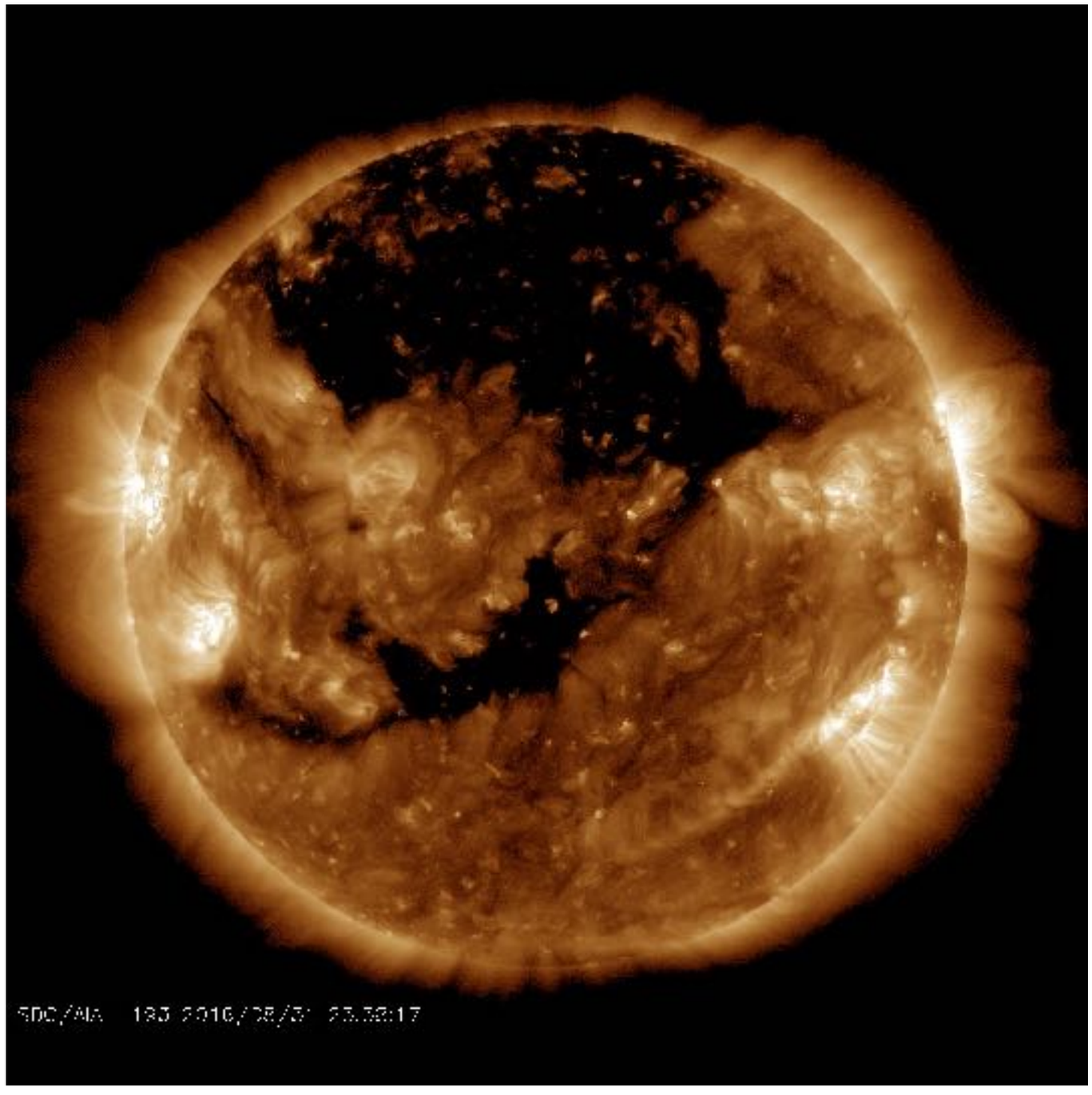
If a CME is detected in situ by a spacecraft located in the interplanetary medium (like ACE, WIND, Ulysses), it is called ICME



RECONNECTION

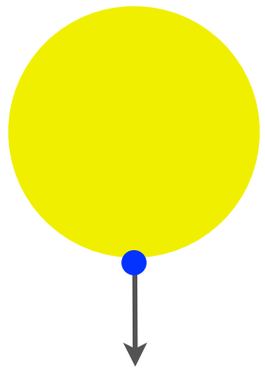
The magnetic field carried by the solar wind can couple with the magnetic field of Earth. This coupling is stronger when the solar wind magnetic field is opposite to the magnetic field of Earth.

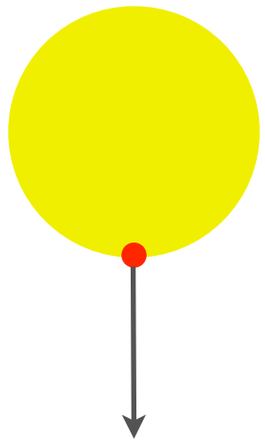
CORONAL HOLE

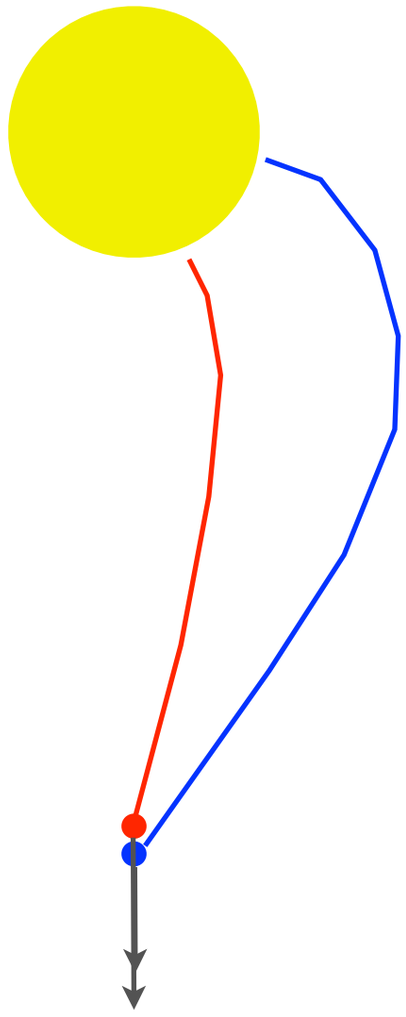


WHAT HAPPENS WHEN FAST CATCHES SLOW?

Top View





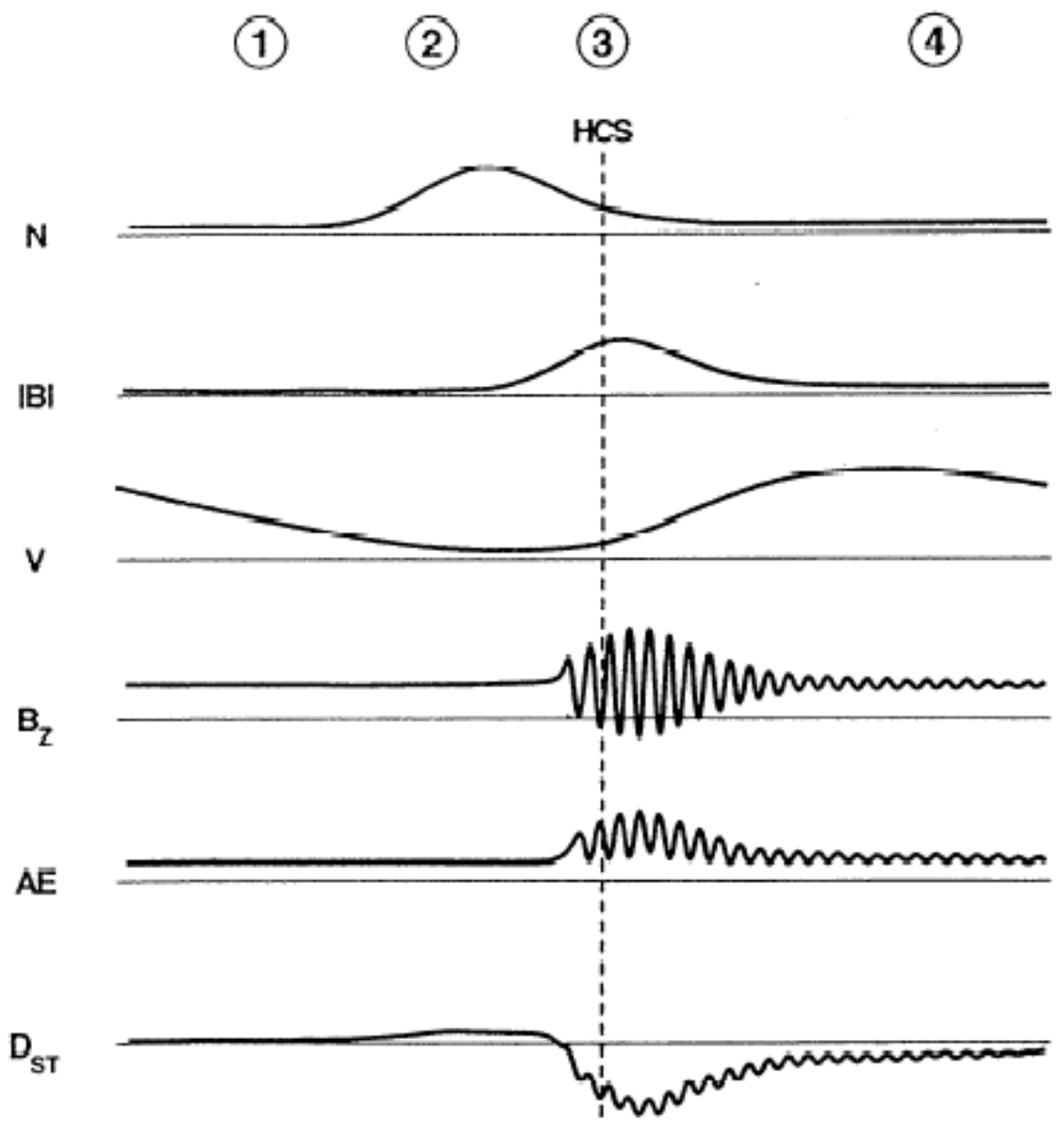


Interaction Region
Rotates together with the Sun

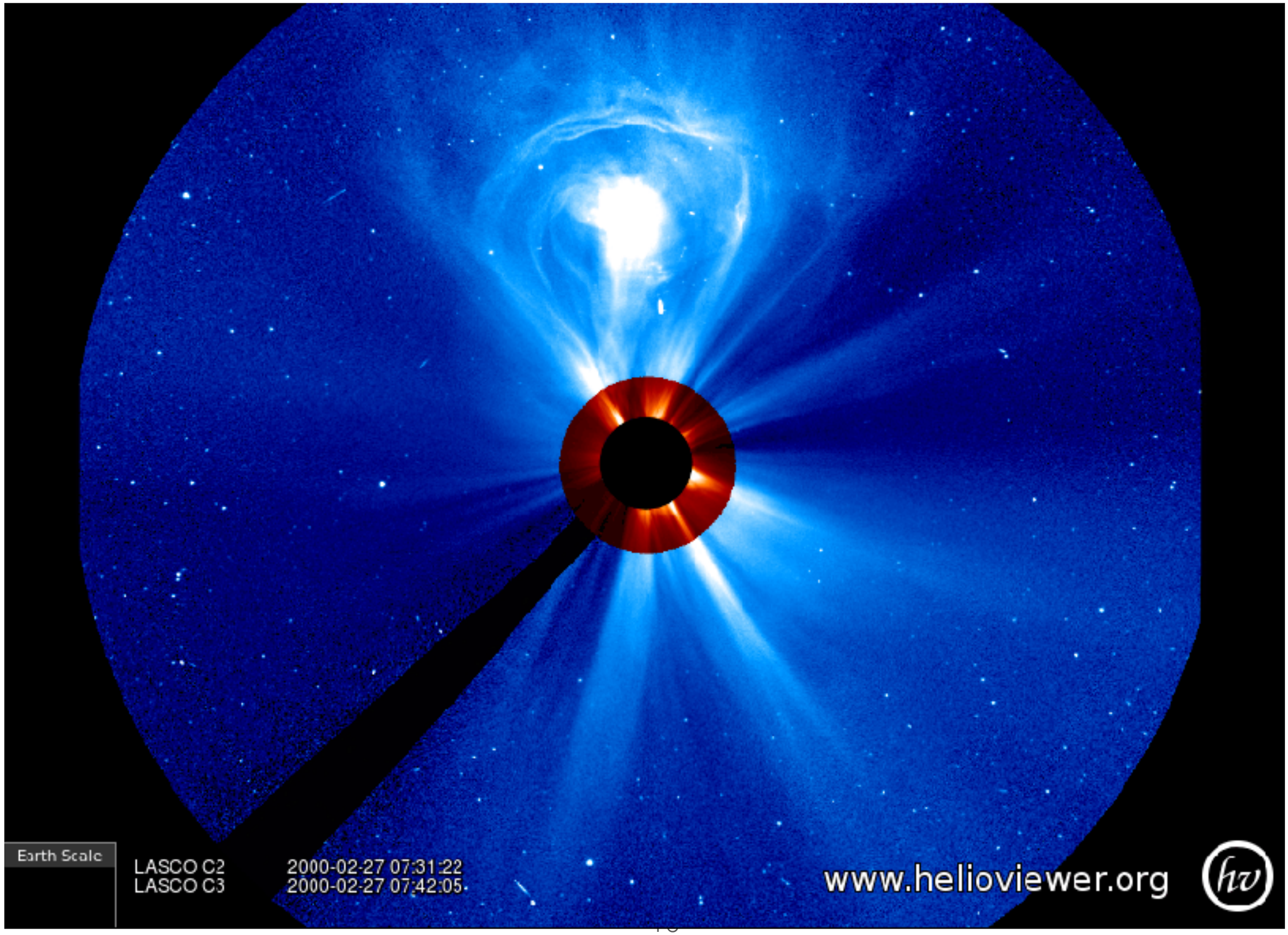
Co-rotating Interaction Region

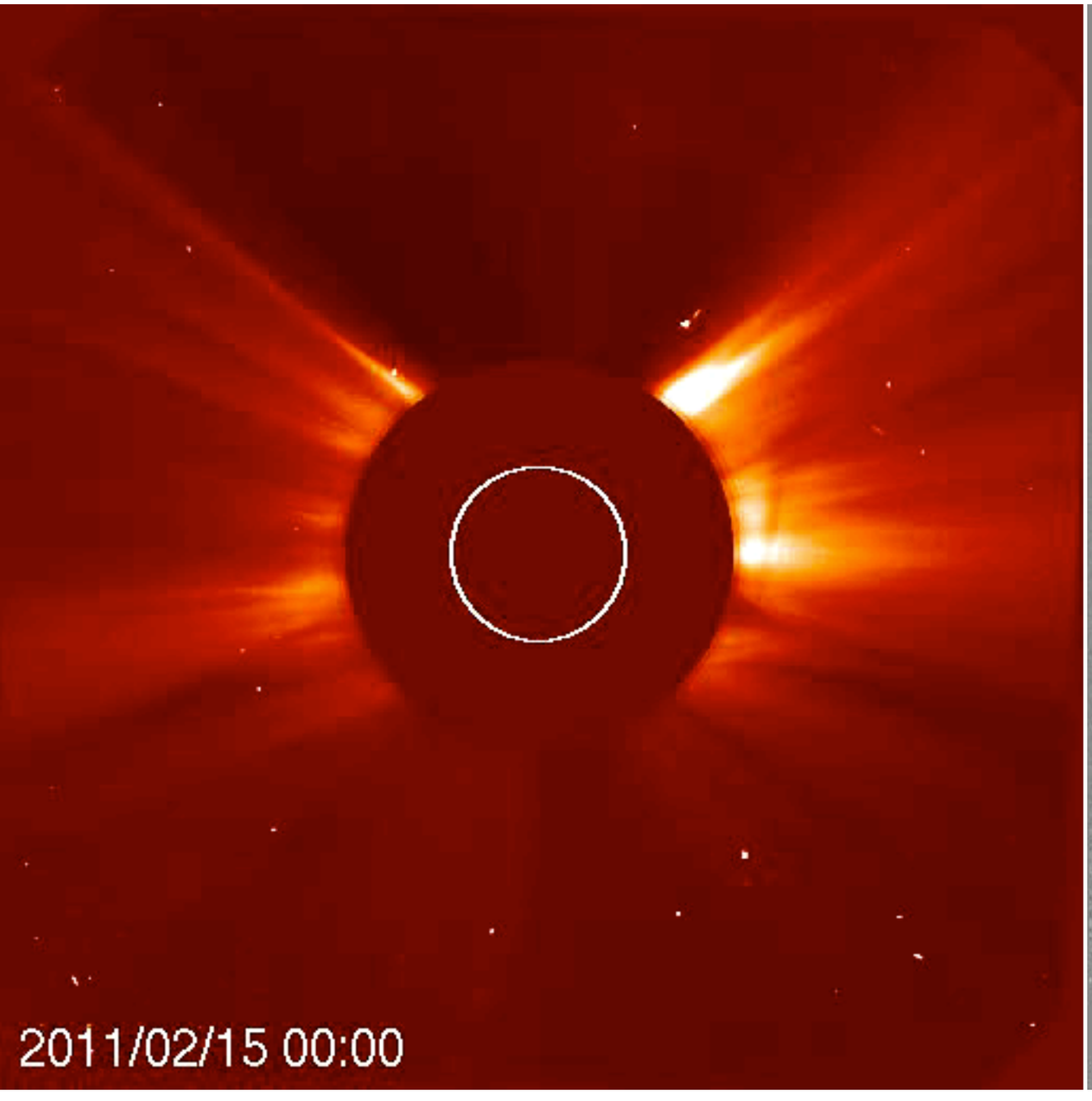
Coronal Hole

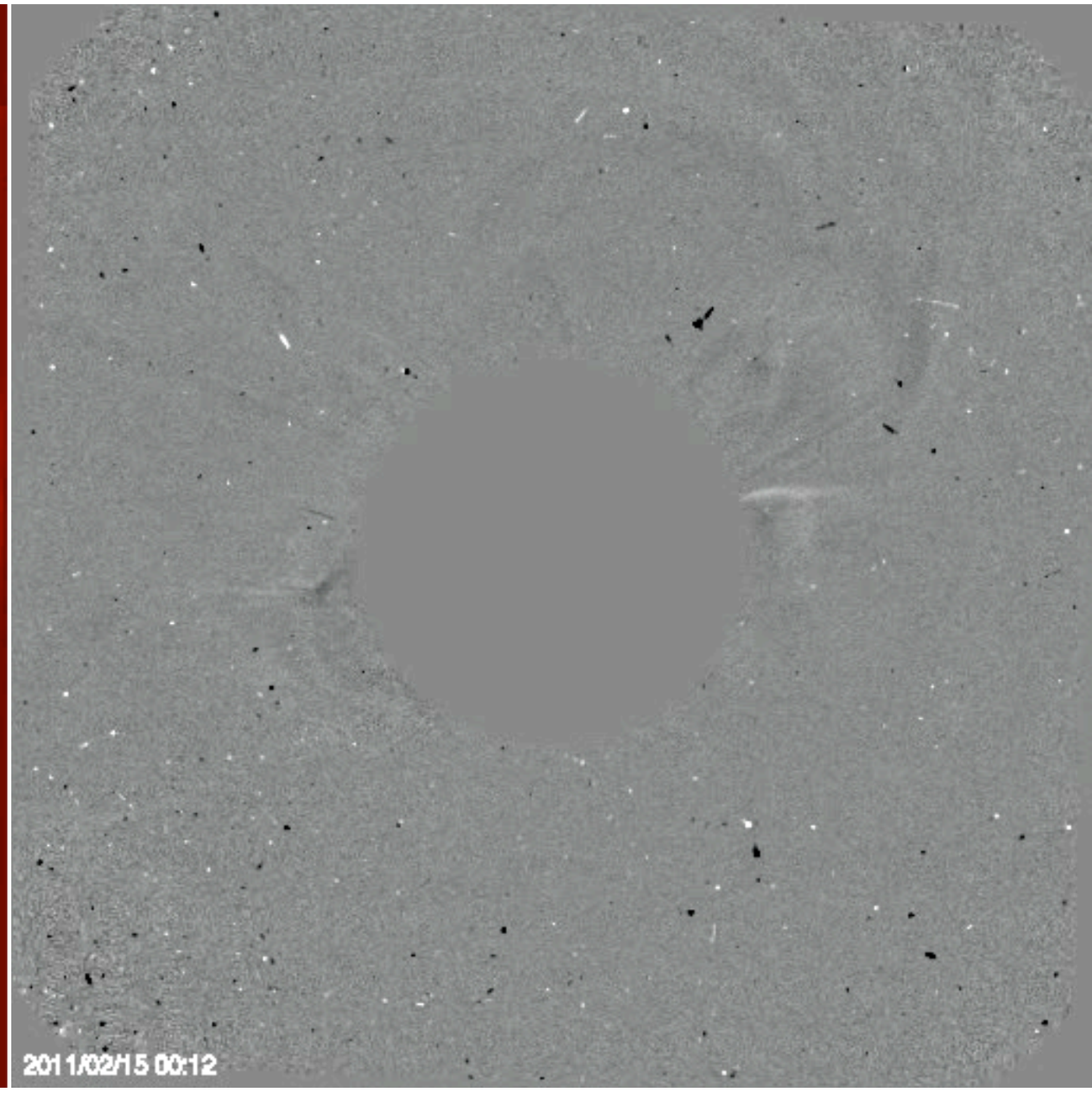
- Co-rotating structure
- Radial!
- No extra mass-flux



CORONAL MASS EJECTION



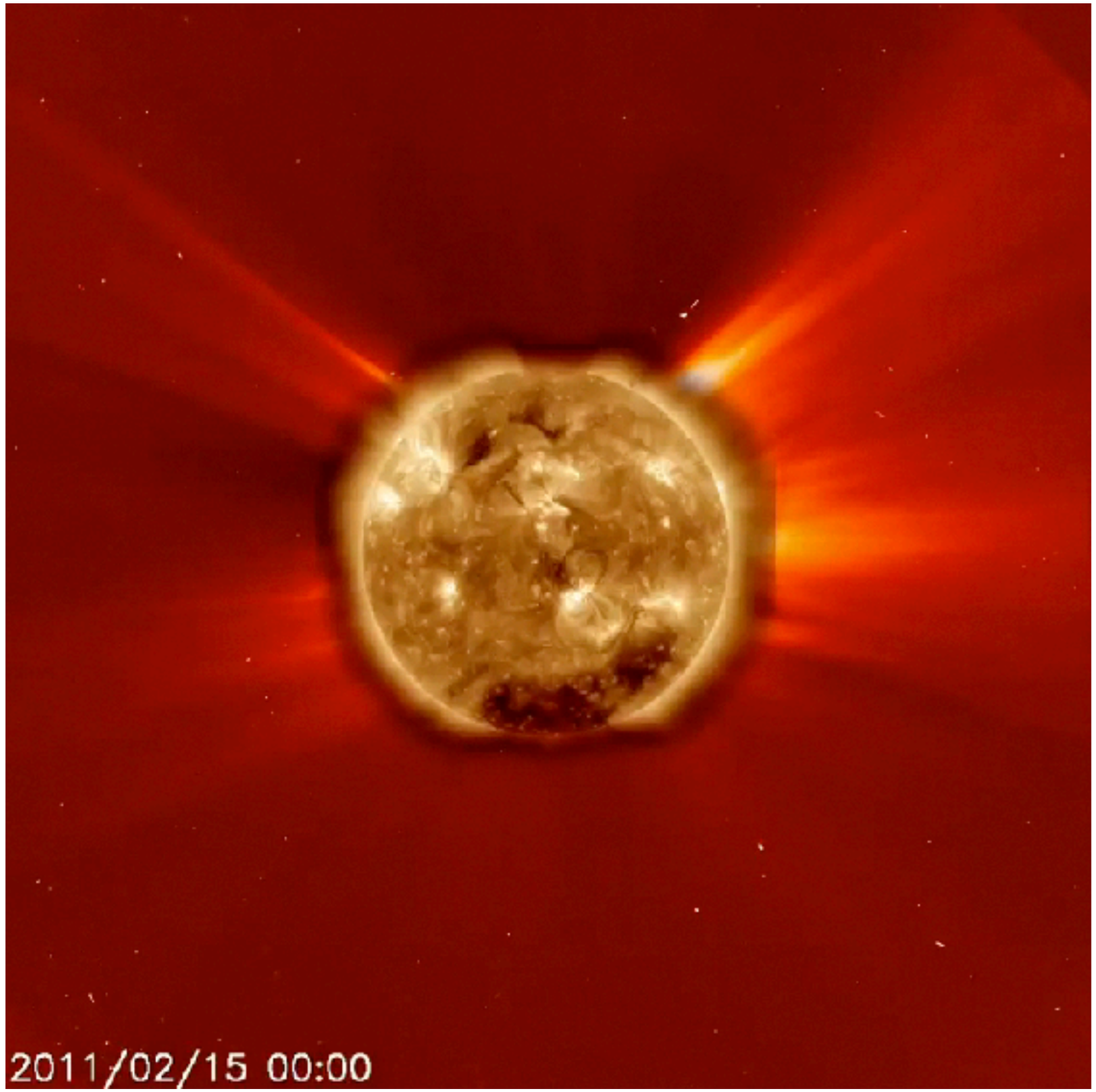


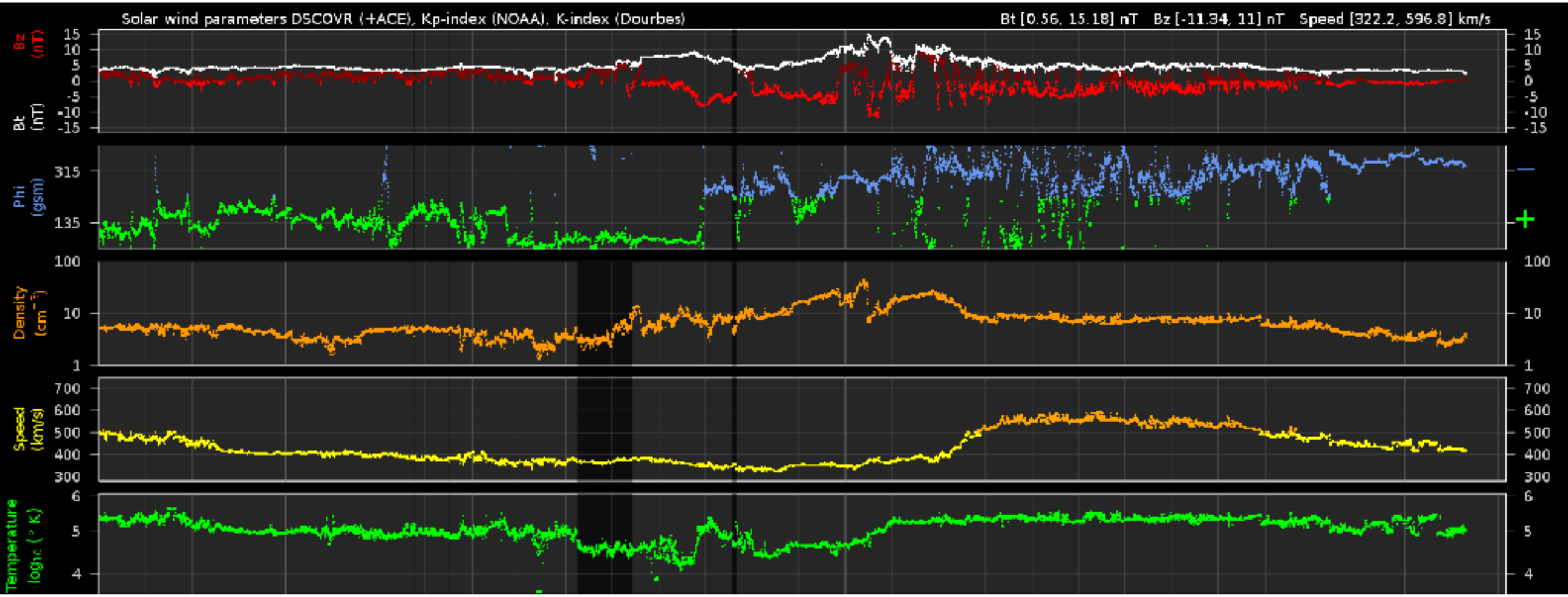


SOHO / LASCO c2

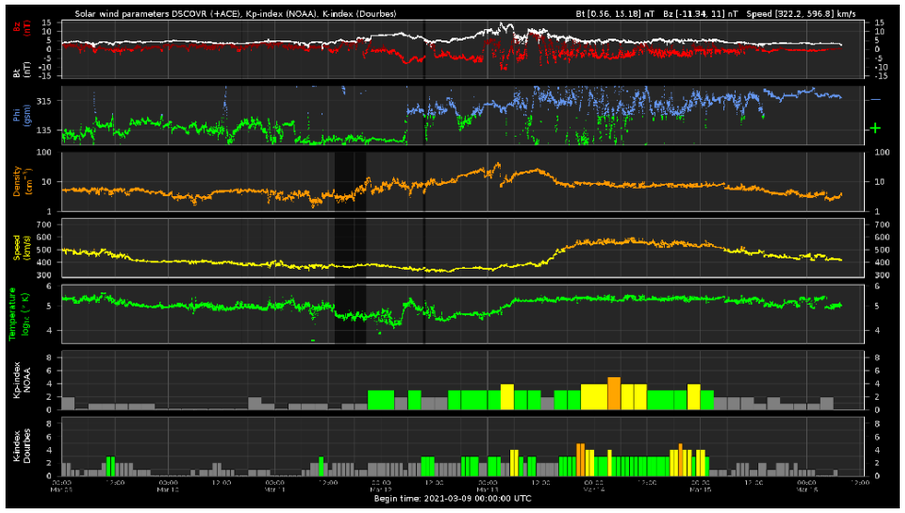
running difference

HALO

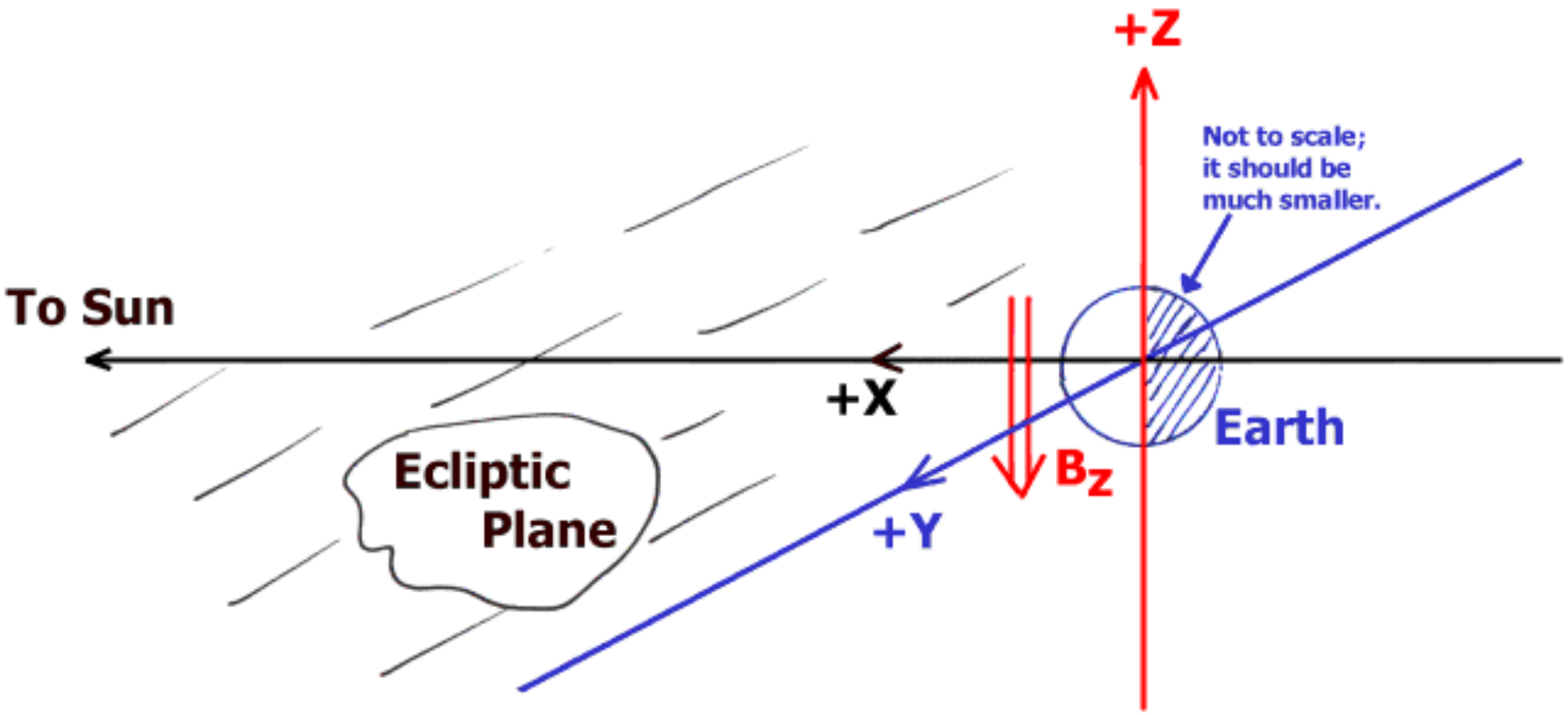



Solar wind parameters DSCOVR (+ACE), Kp-index (NOAA), K-index (Dourbes)
Bt [0.56, 15.18] nT Bz [-11.34, 11] nT Speed [322.2, 596.8] km/s
Bz (nT)
Bt (nT)
Phi (gsm)
Density (cm⁻³)
Speed (km/s)
Temperature log10 (° K)

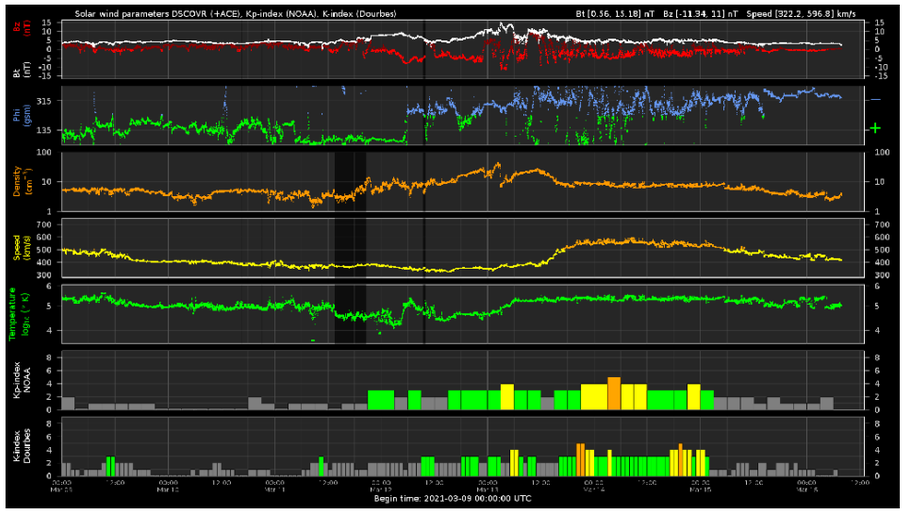
DSCOVR



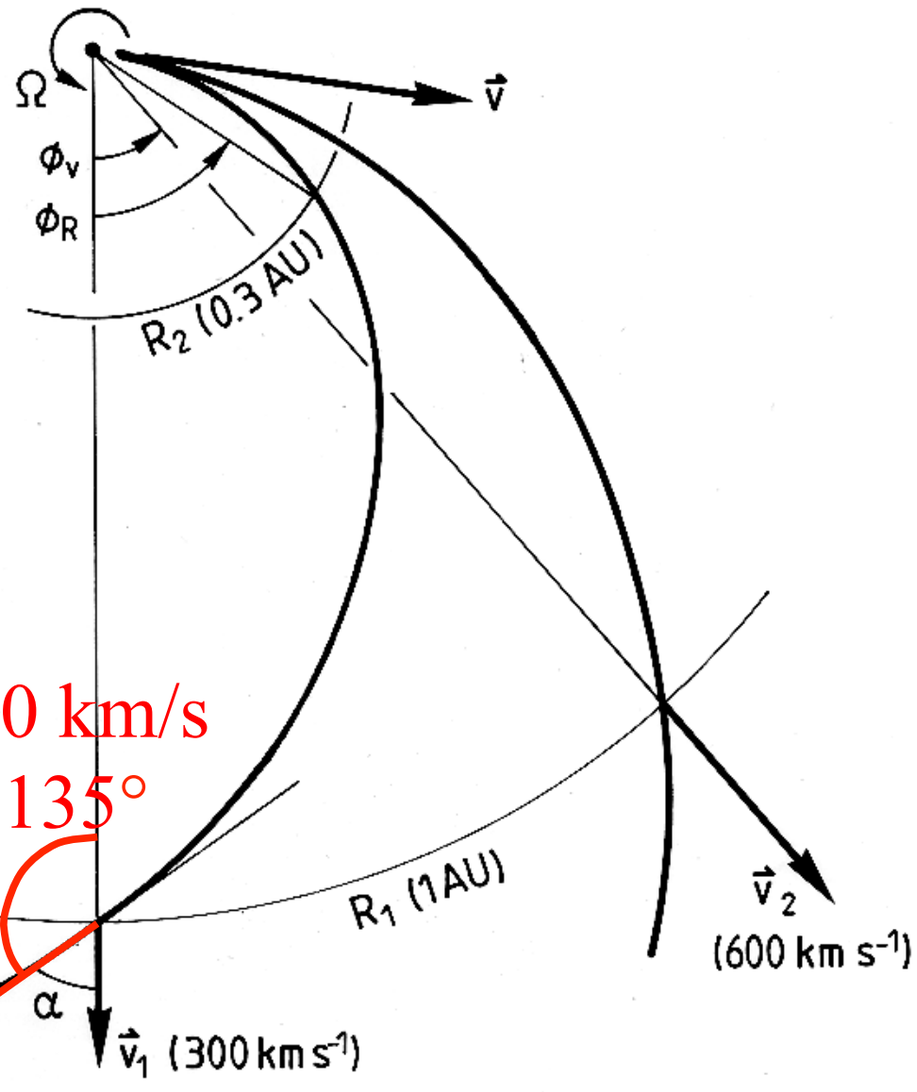
COORDINATE SYSTEM



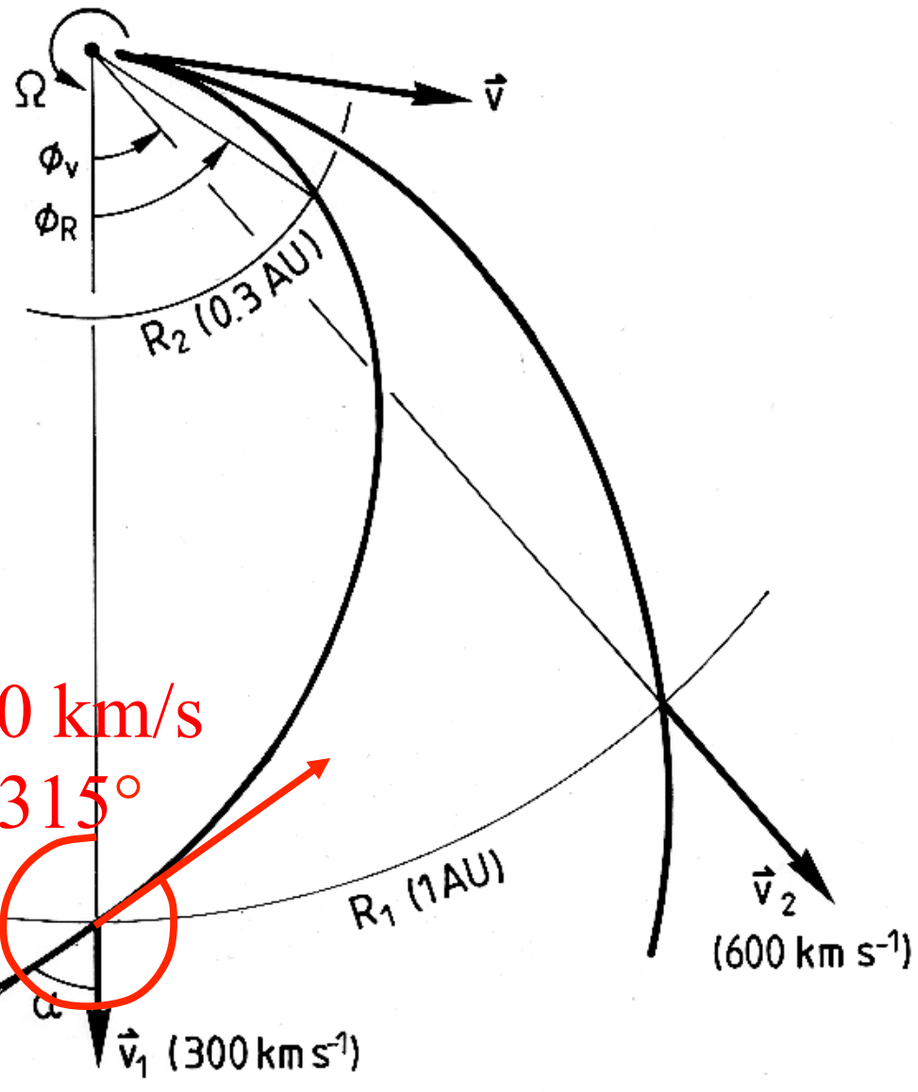
+Z is perpendicular to the Ecliptic Plane.



IMF POLARITY



for 400 km/s
φ ~ 135°



for 400 km/s
φ ~ 315°

Exercices

https://www.stce.be/presentations/SWICMarch2021/