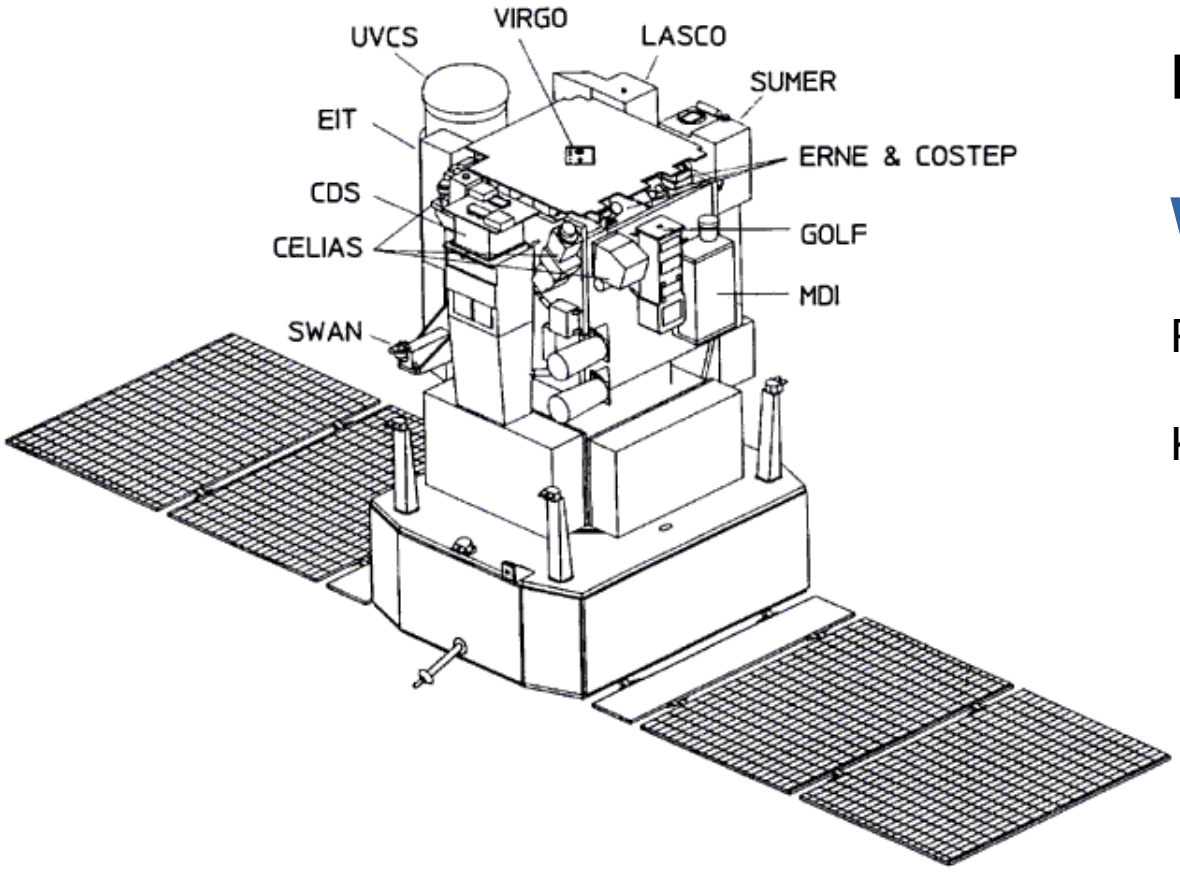
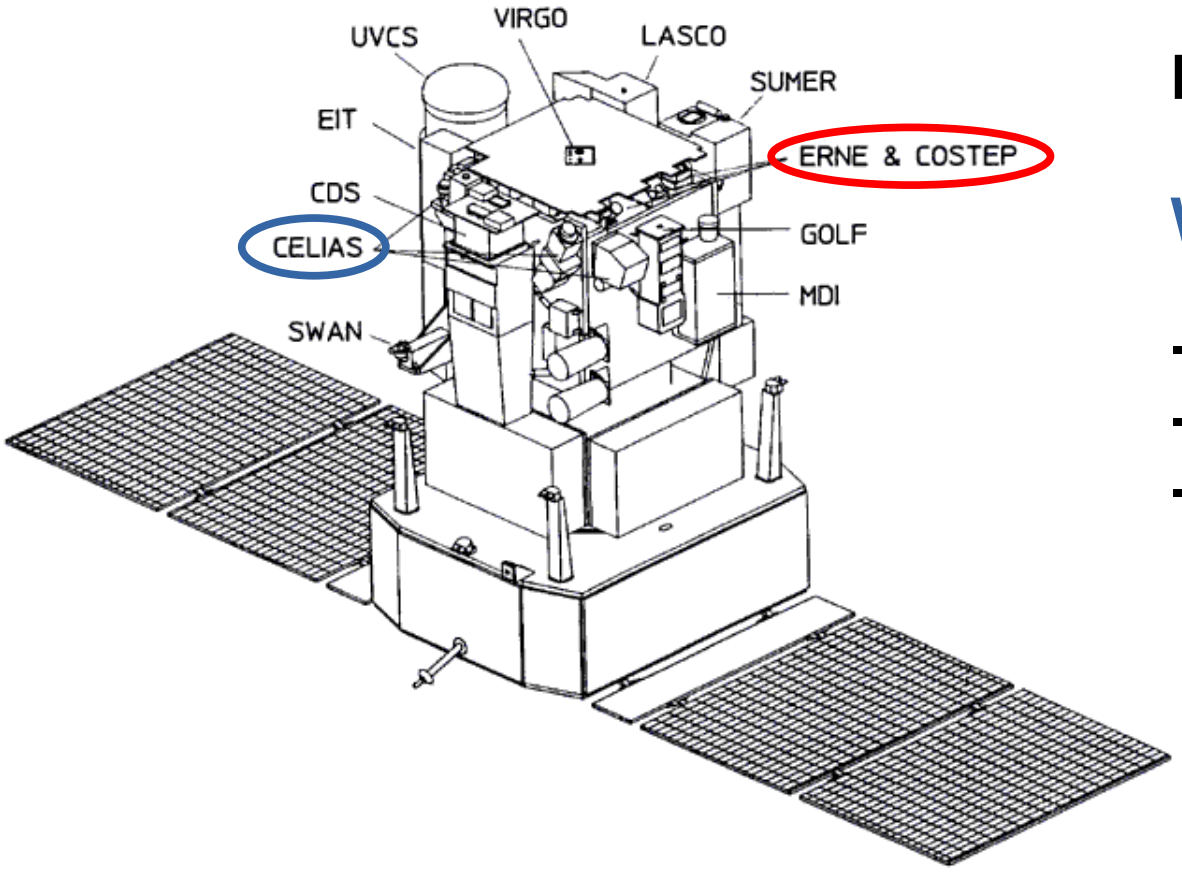


Highlights SOHO/Science:

Wind & Particles

Robert F. Wimmer-Schweingruber

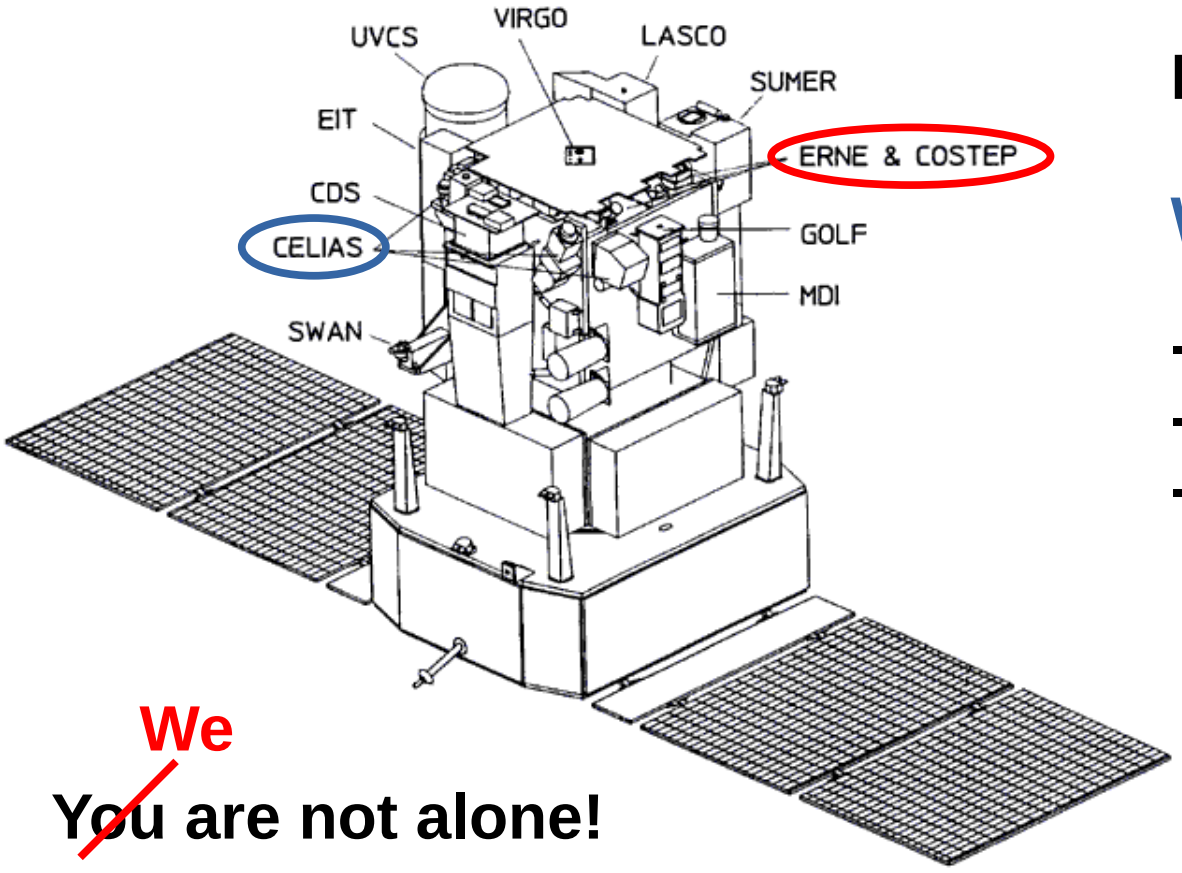
Kiel University, Kiel, Germany



Highlights SOHO/Science:

Wind & Particles

- link Sun to heliosphere
- heliosphere
- heliosphere, quo vadis?



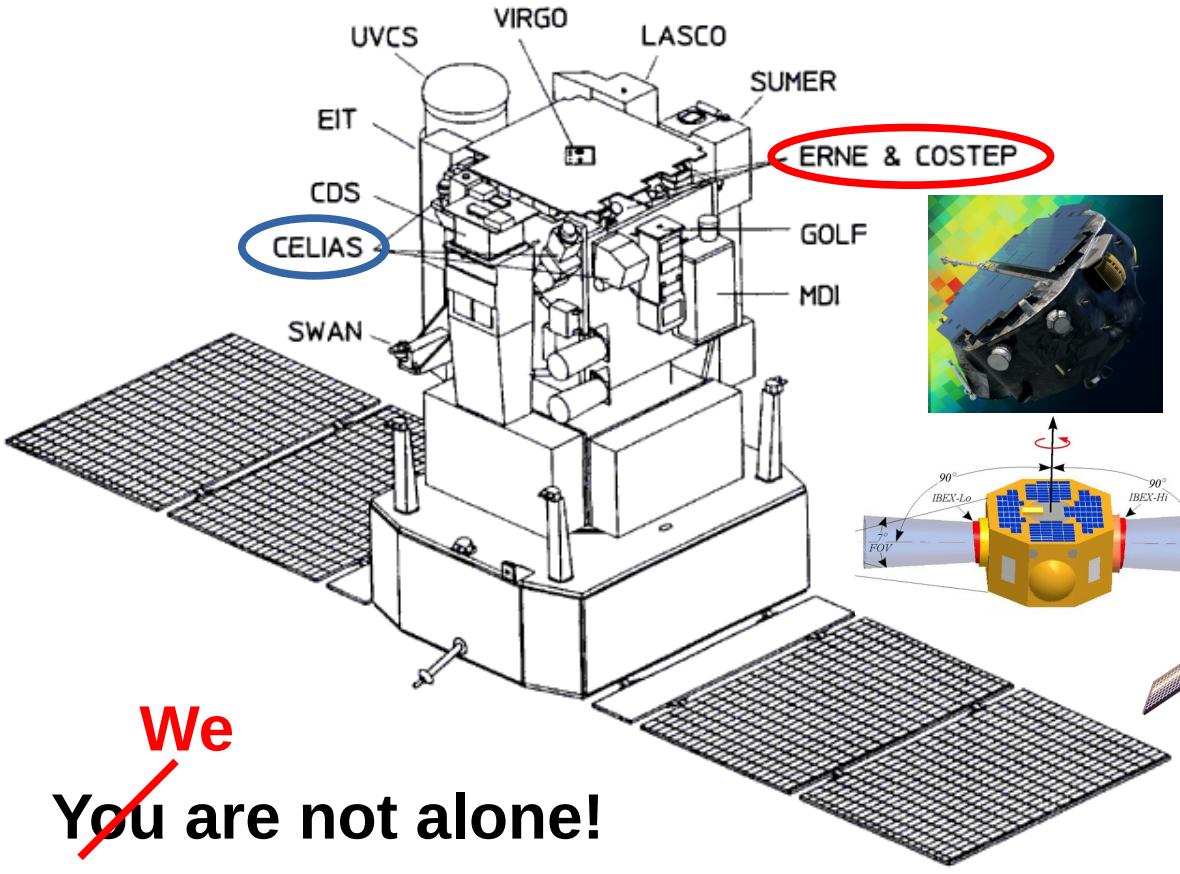
We

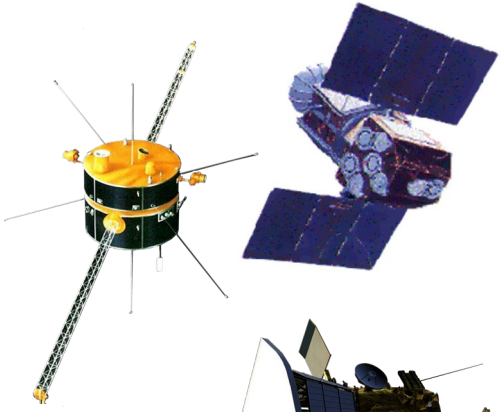
You are not alone!

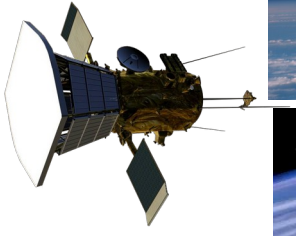
Highlights SOHO/Science:

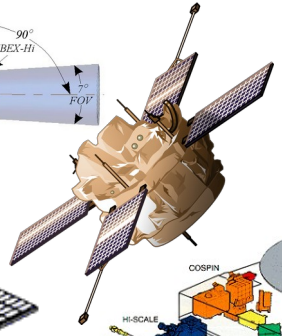
Wind & Particles

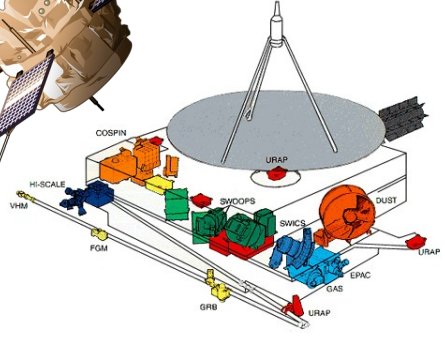
- link Sun to heliosphere
- heliosphere
- heliosphere, quo vadis?





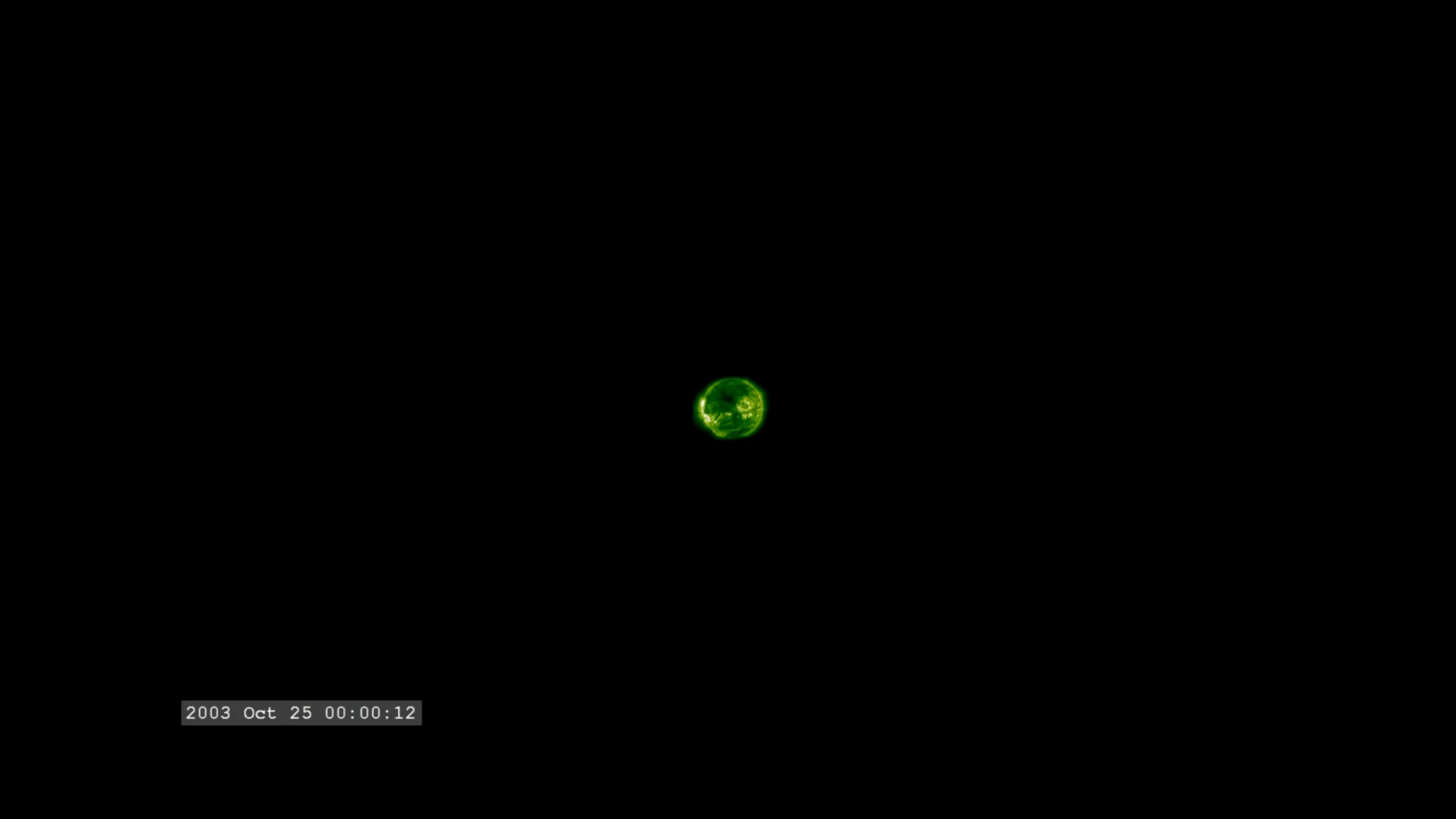






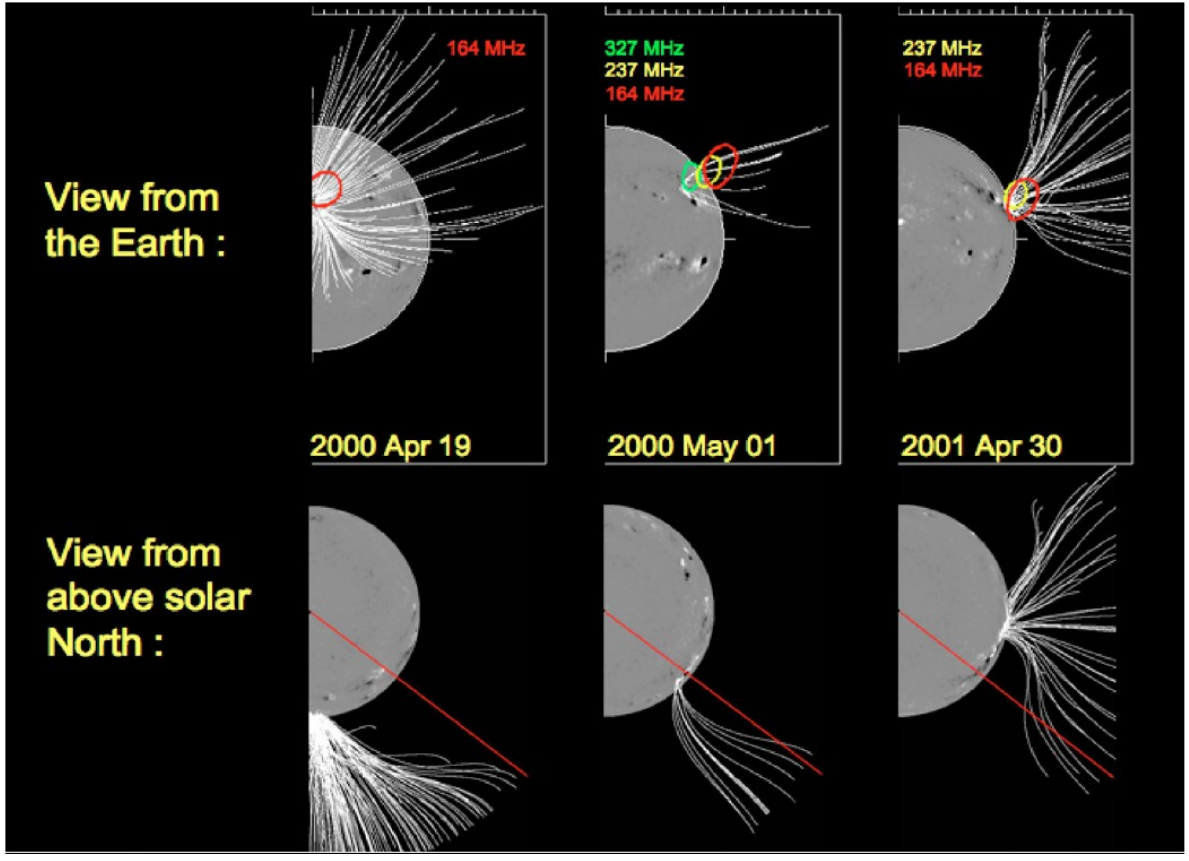
~~We~~

You are not alone!

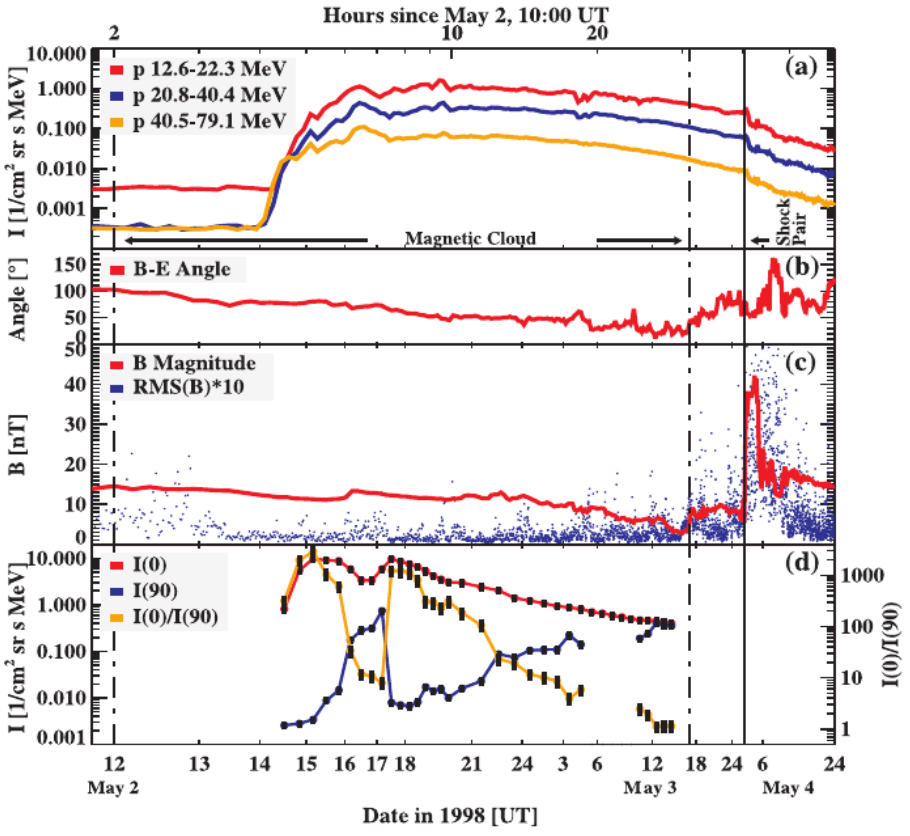

2003 Oct 25 00:00:12

Charged particles can’t simply go where they want!

Coronal/Interplanetary magnetic field rules.

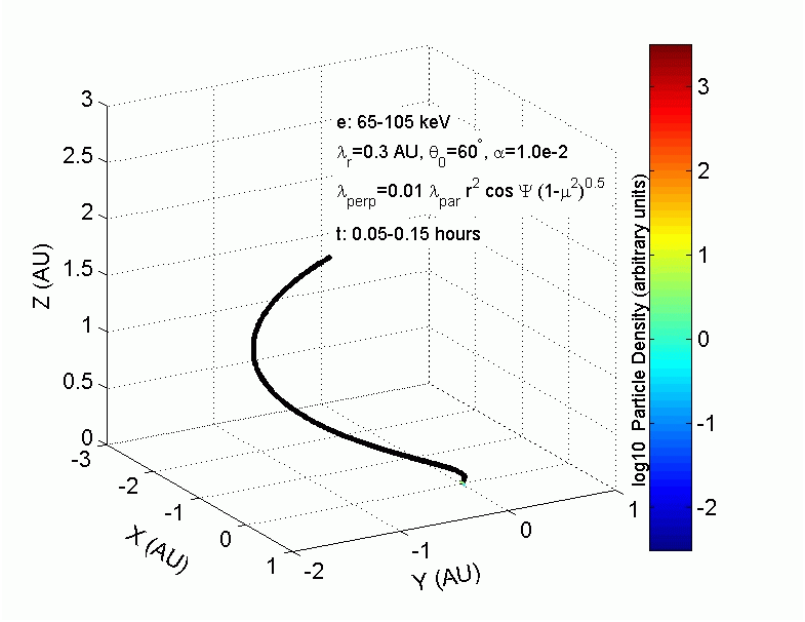


(Klein et al., 2008)

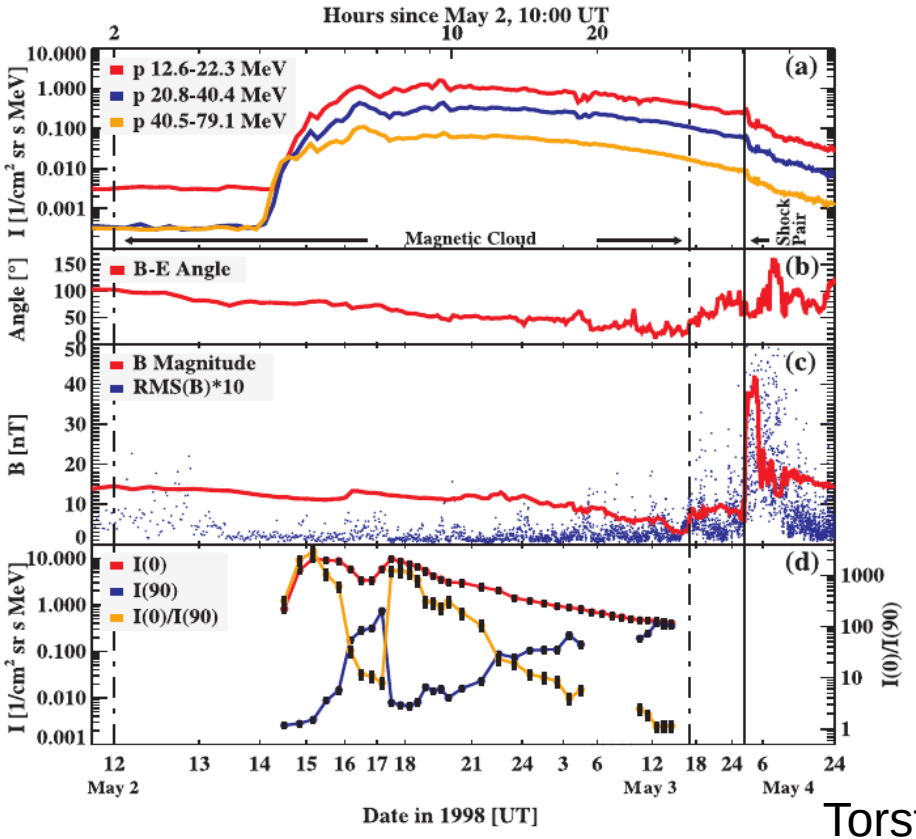


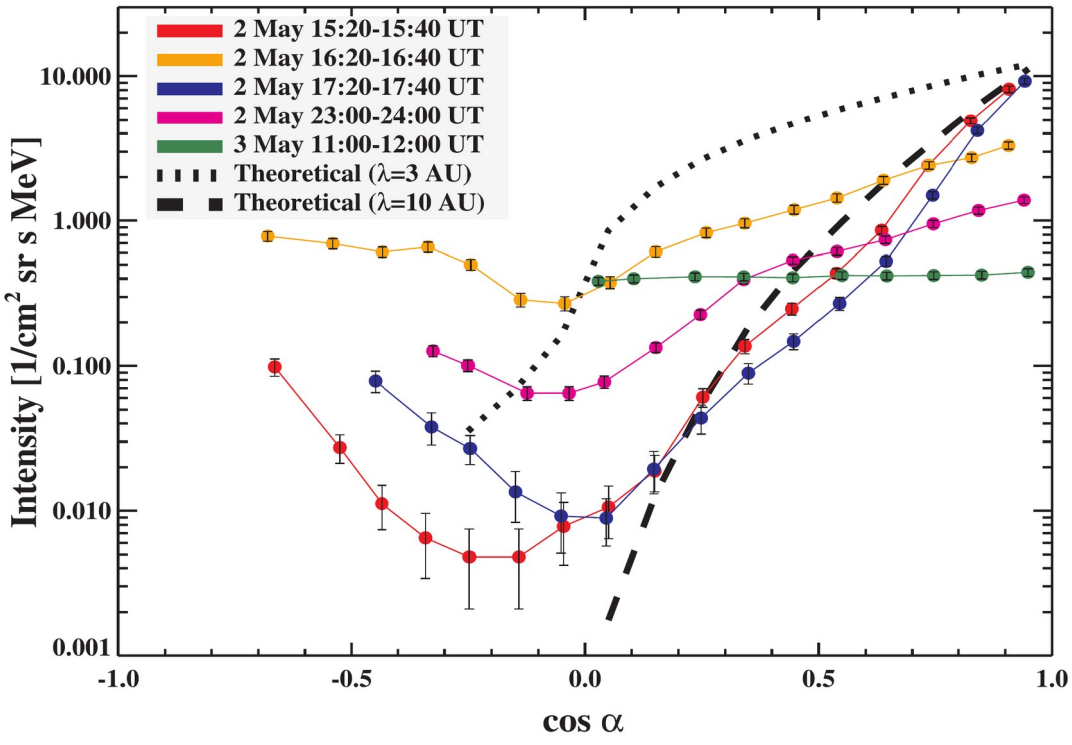
(Torsti et al., 2004)

How do these particles travel from outer corona to SOHO?

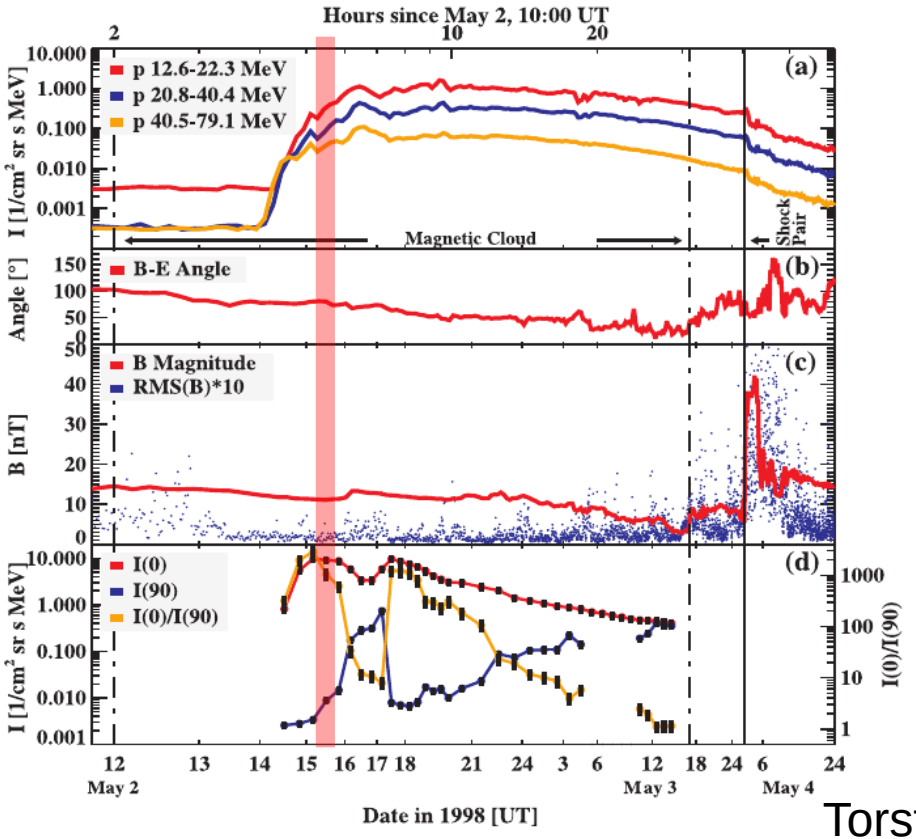


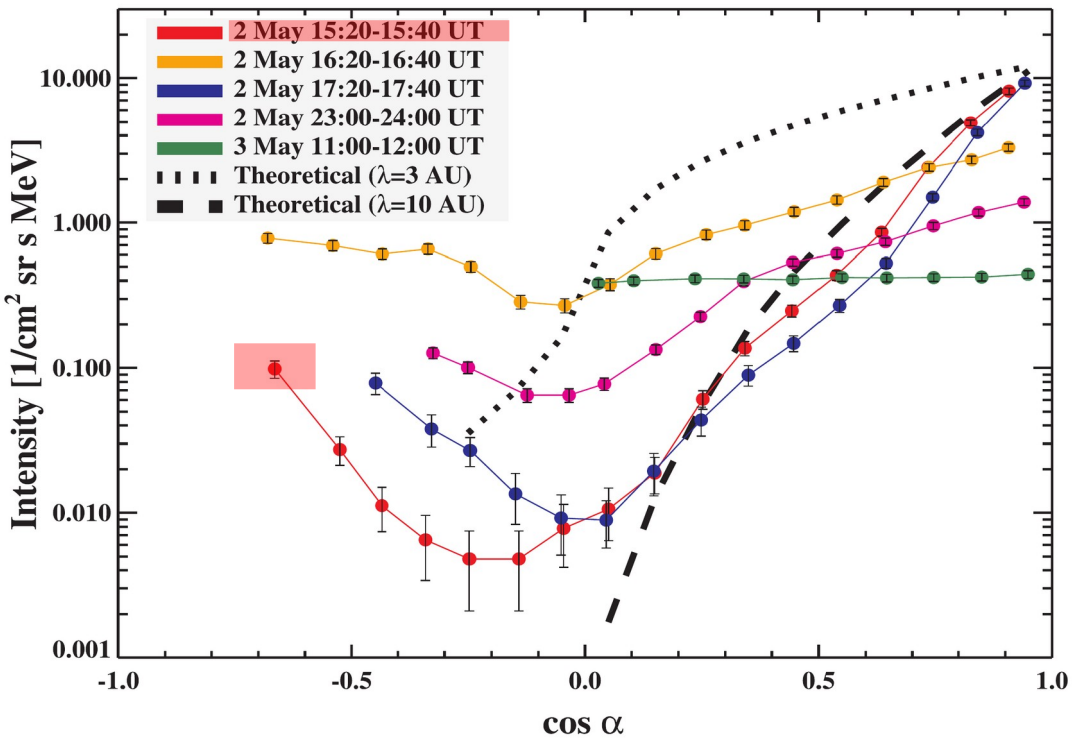
(Kartavykh, pers. Comm., 2025)



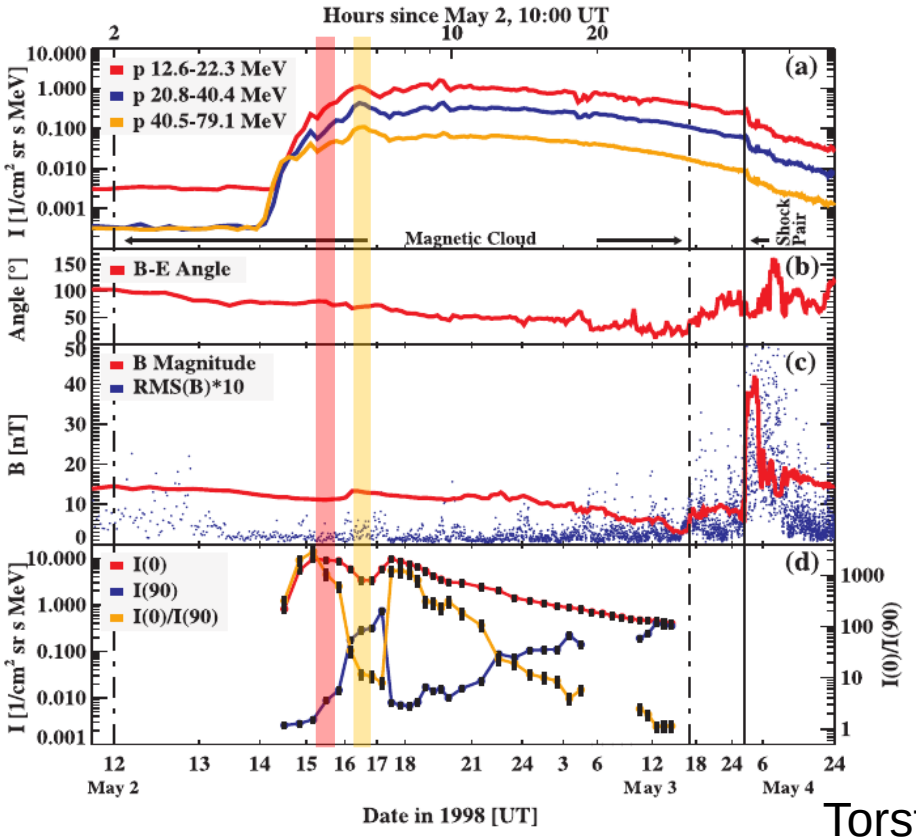


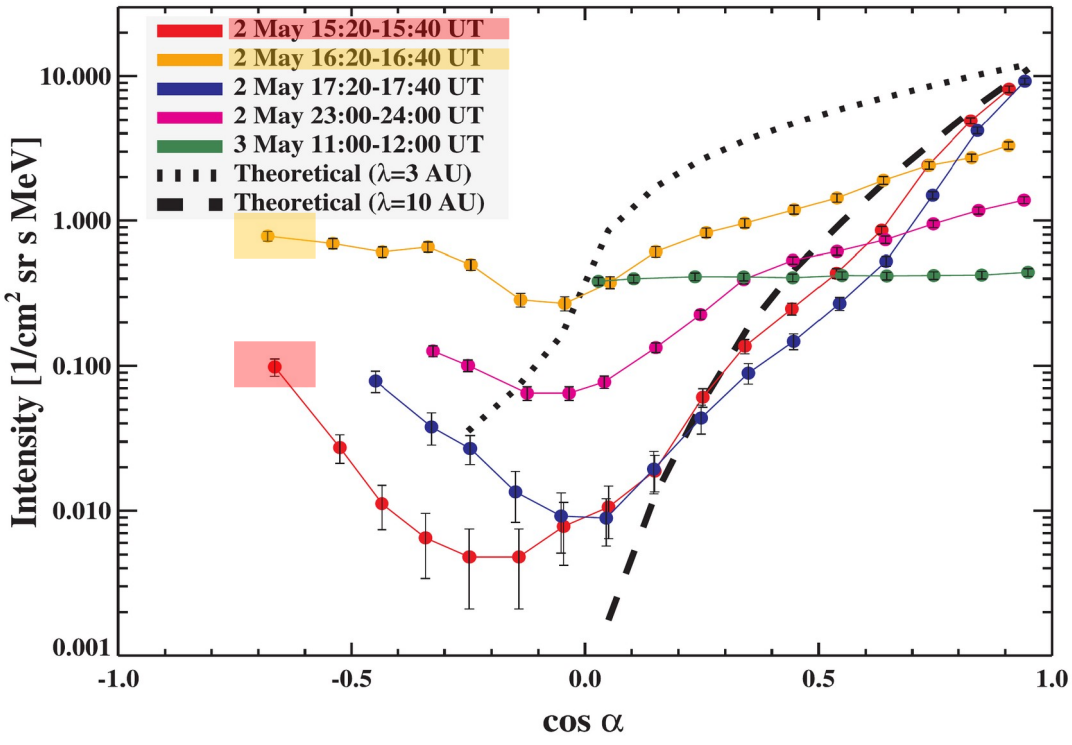
Torsti et al. (2004)



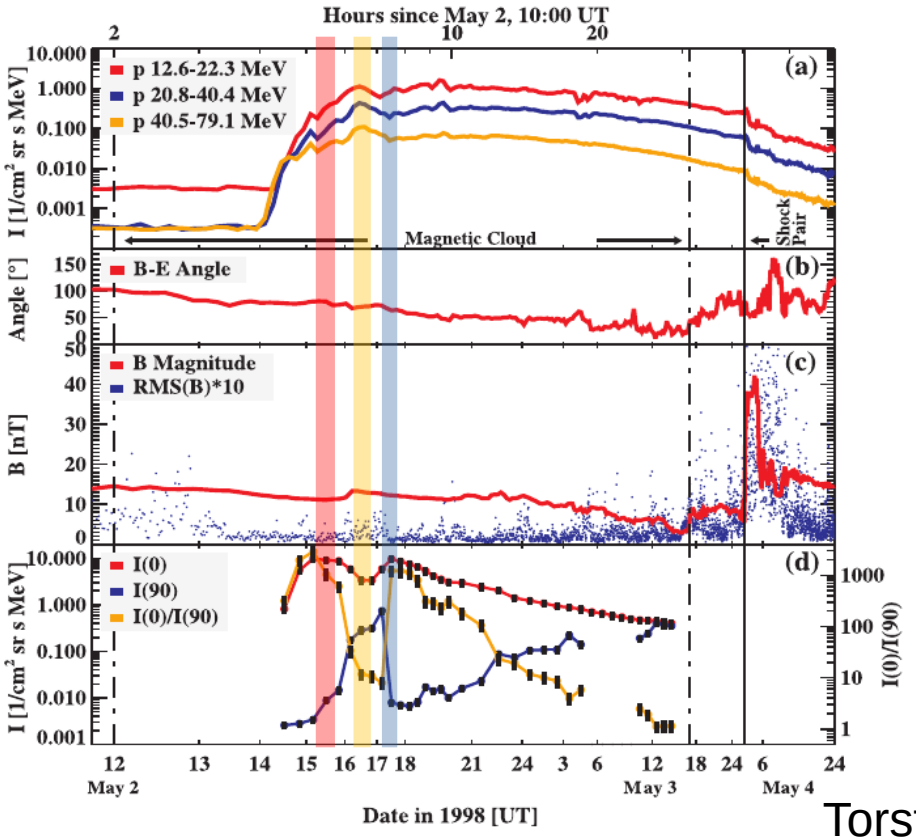


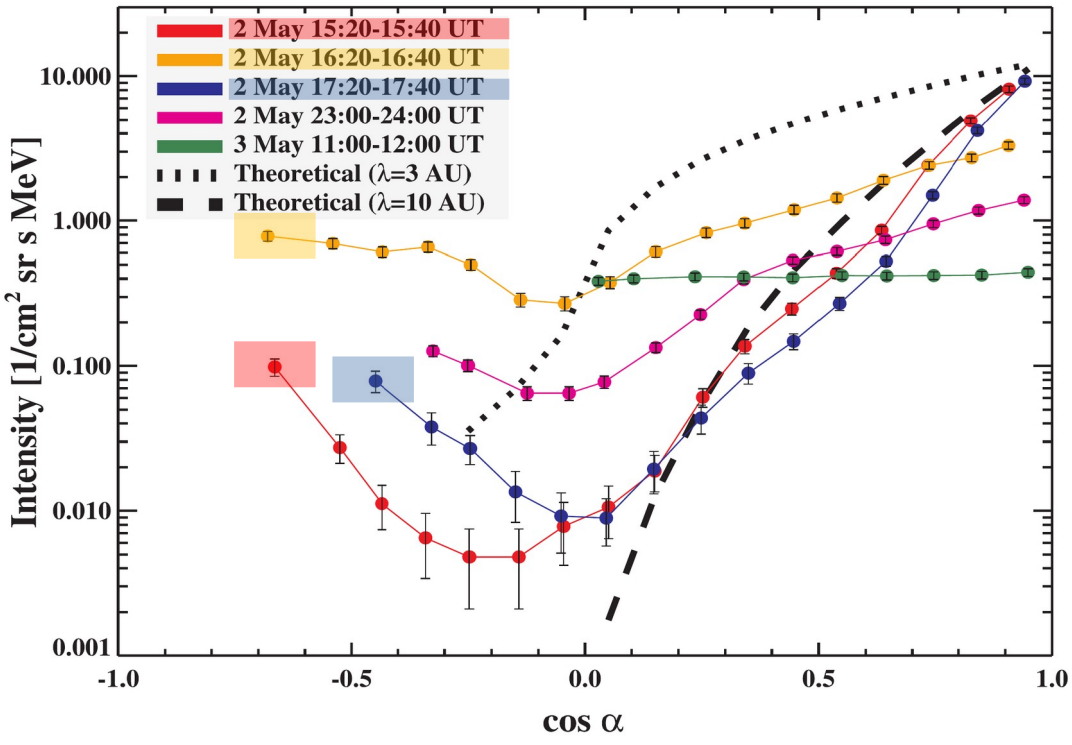
Torsti et al. (2004)



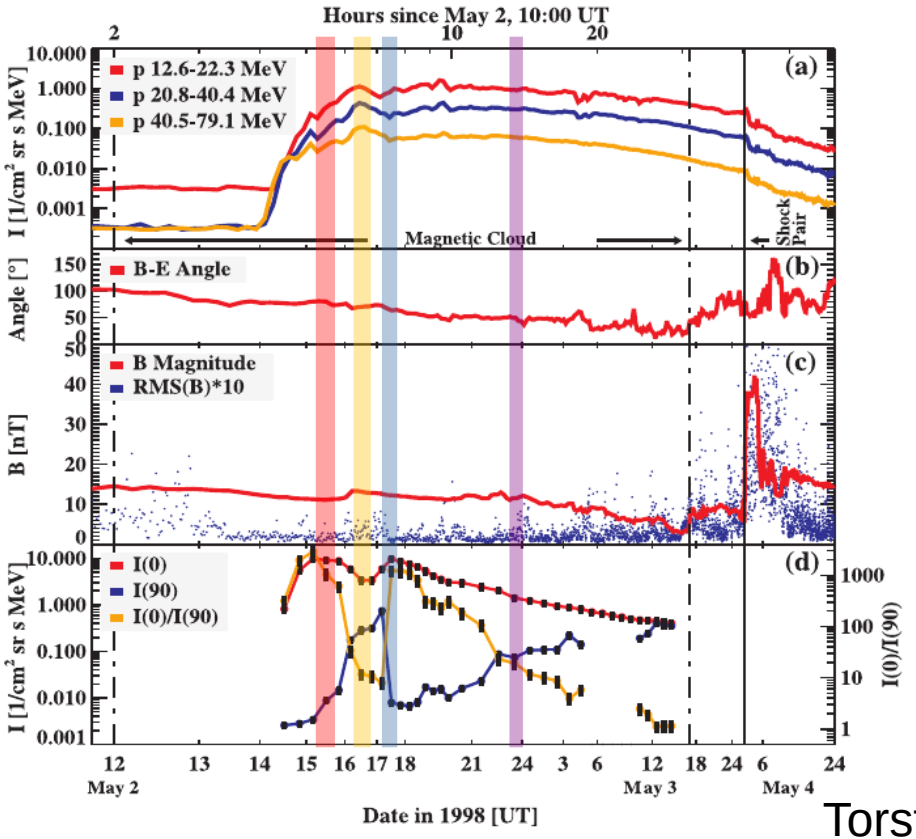


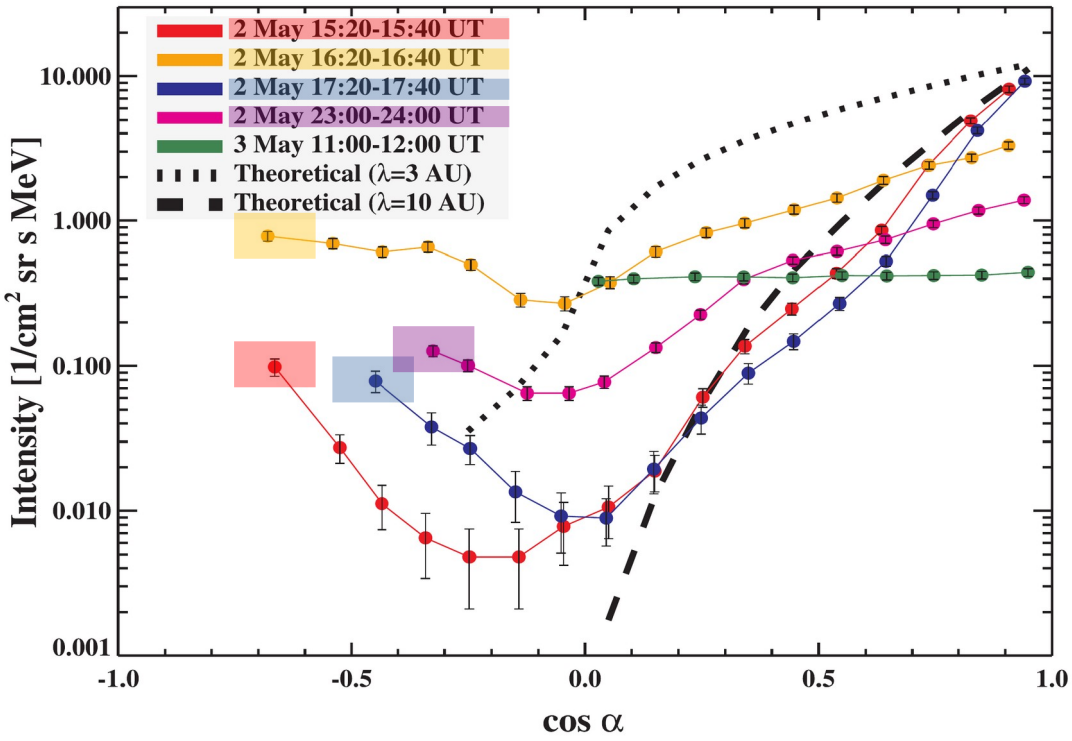
Torsti et al. (2004)



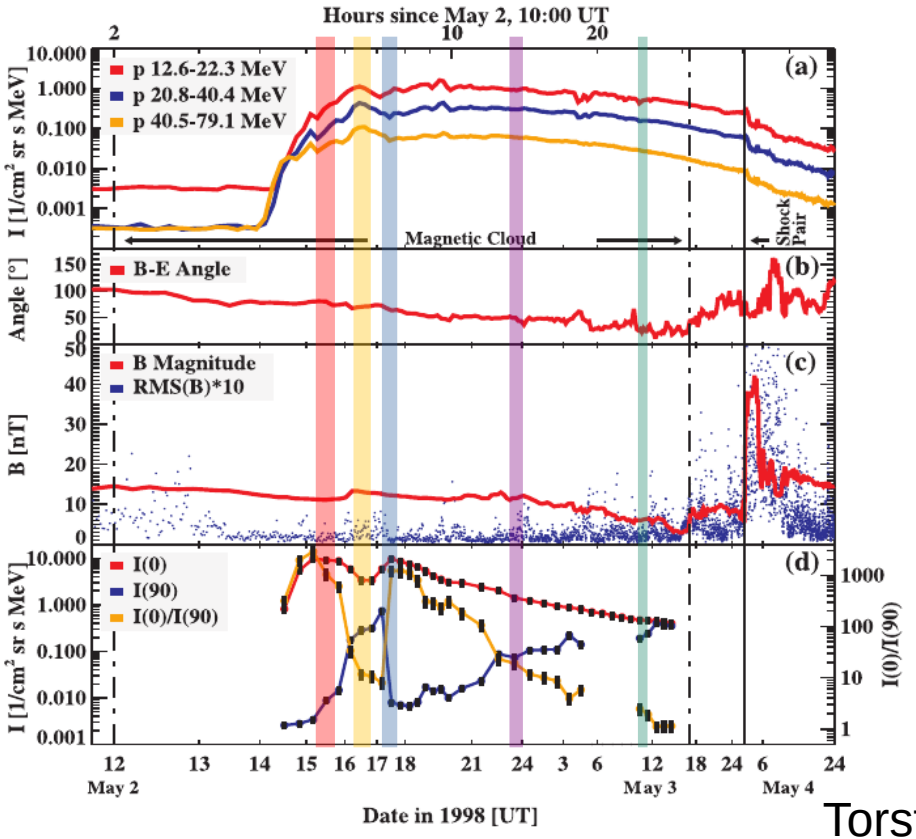


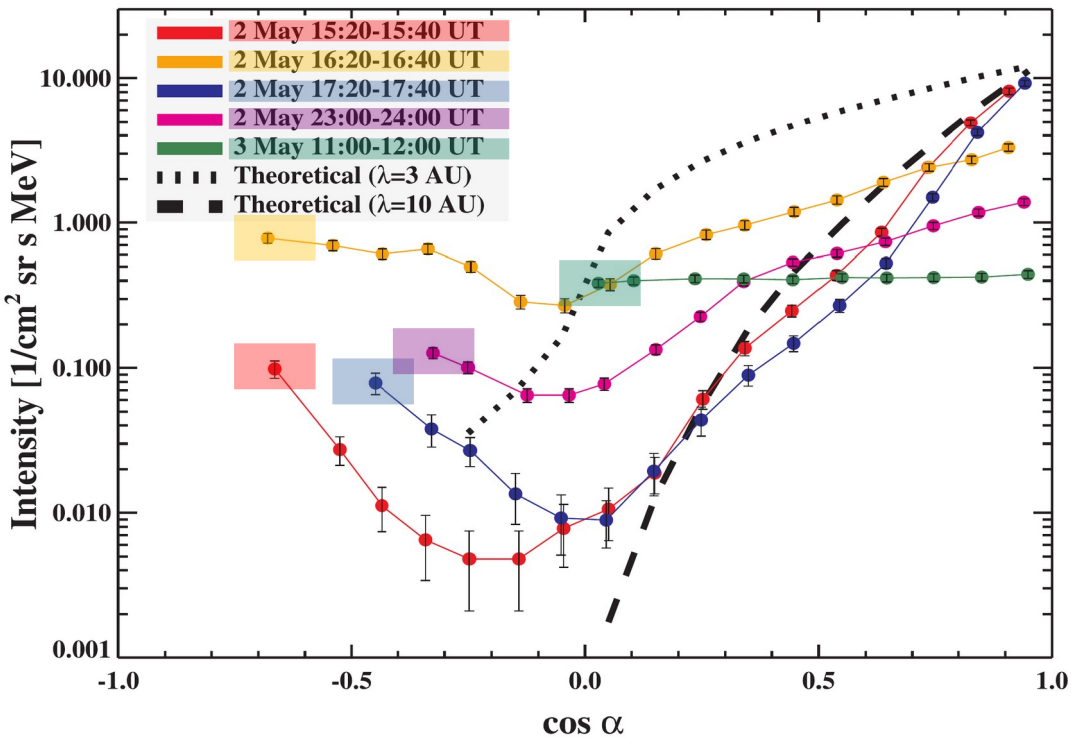
Torsti et al. (2004)





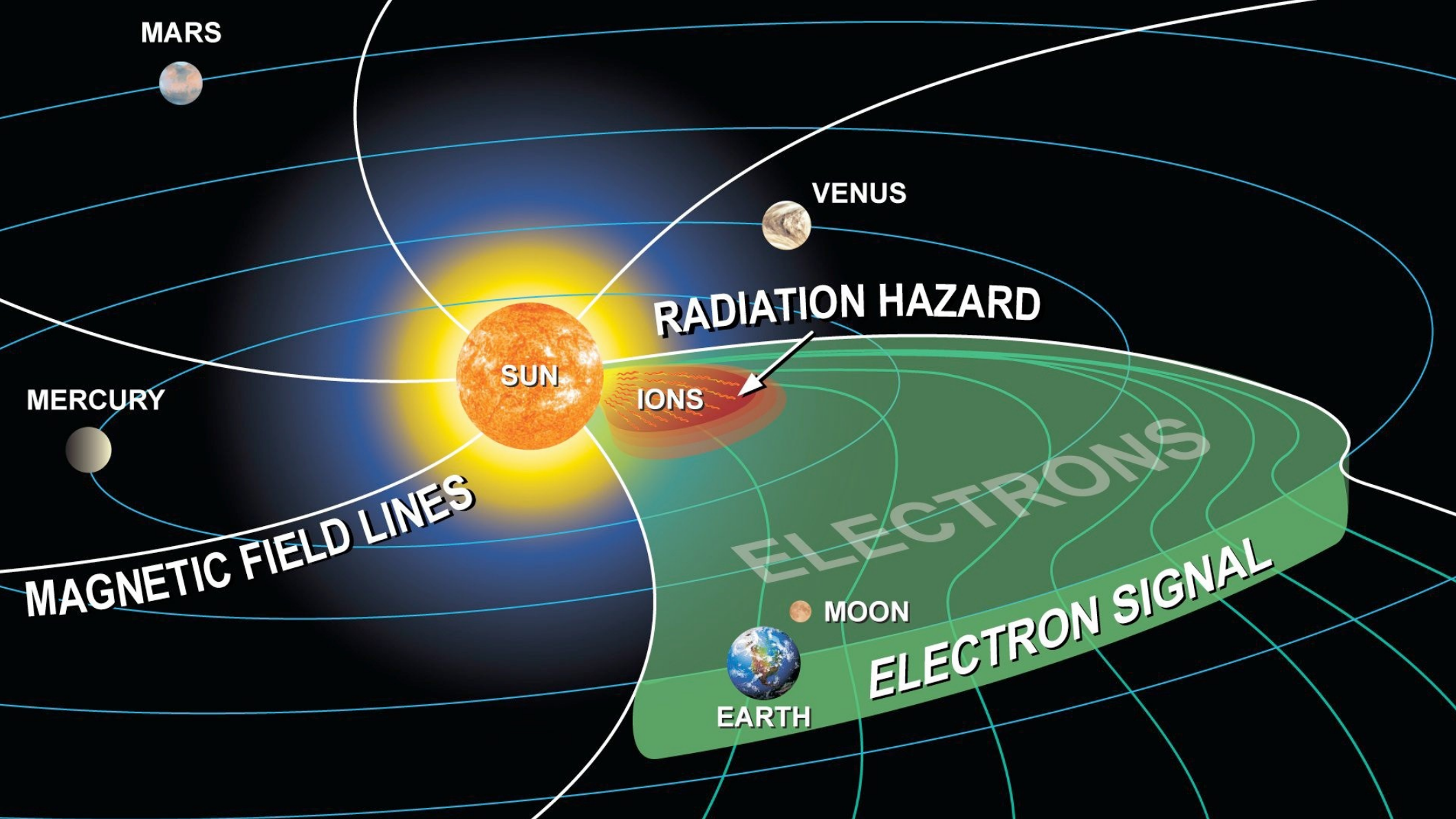
Torsti et al. (2004)





Torsti et al. (2004)

CME serves as a “highway” for particles. MFP > 10 AU


MARS
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RADIATION HAZARD
SUN
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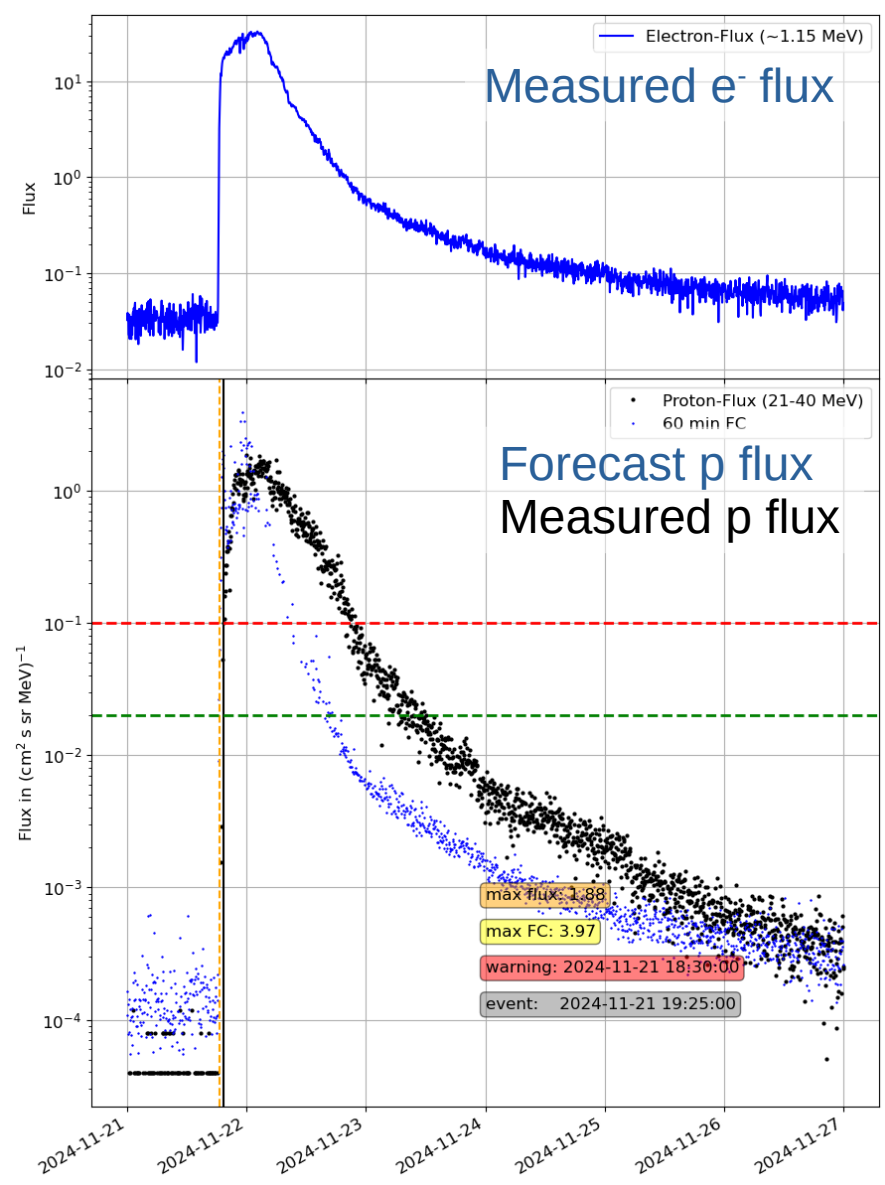
MERCURY
MAGNETIC FIELD LINES
ELECTRONS
MOON
ELECTRON SIGNAL
EARTH

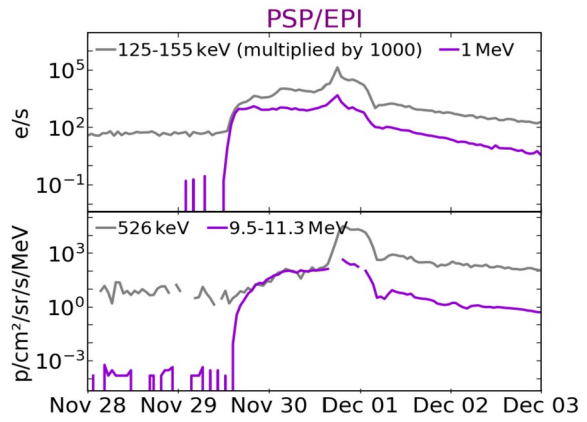


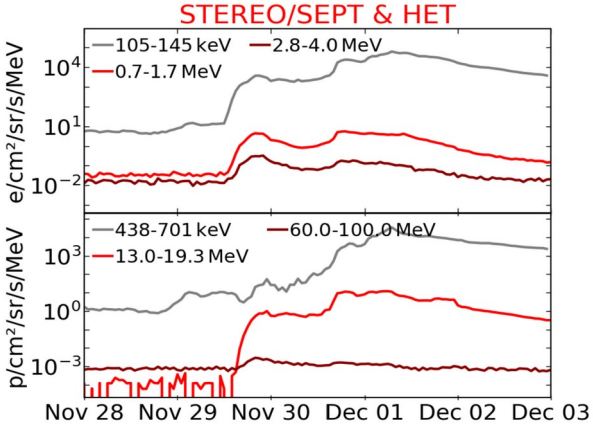
Use energetic electrons as an early warning system!

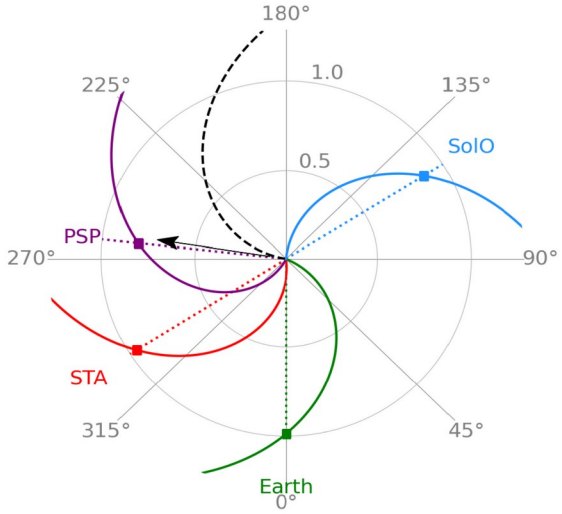
Hesperia/REleASE.

(**H**igh-**e**nergy **s**olar **p**article **e**vents fo**r**ecast**i**ng and **a**nalysis/**R**elativistic **Ele**ctron **A**lert **S**ystem for **E**xploration)

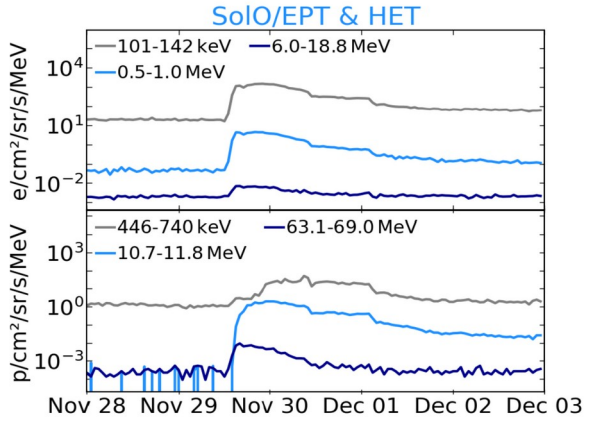
This example shows a warning time of 55 minutes.

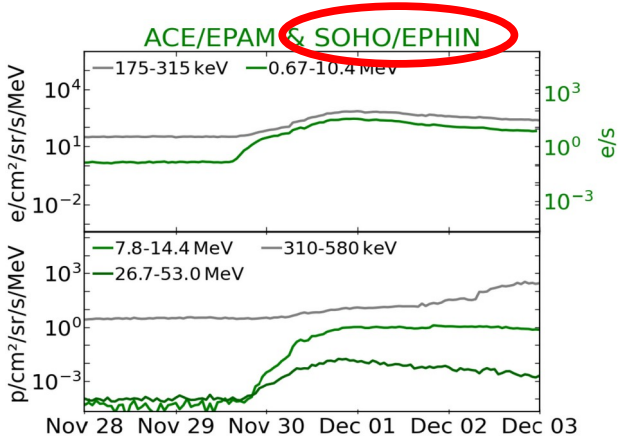


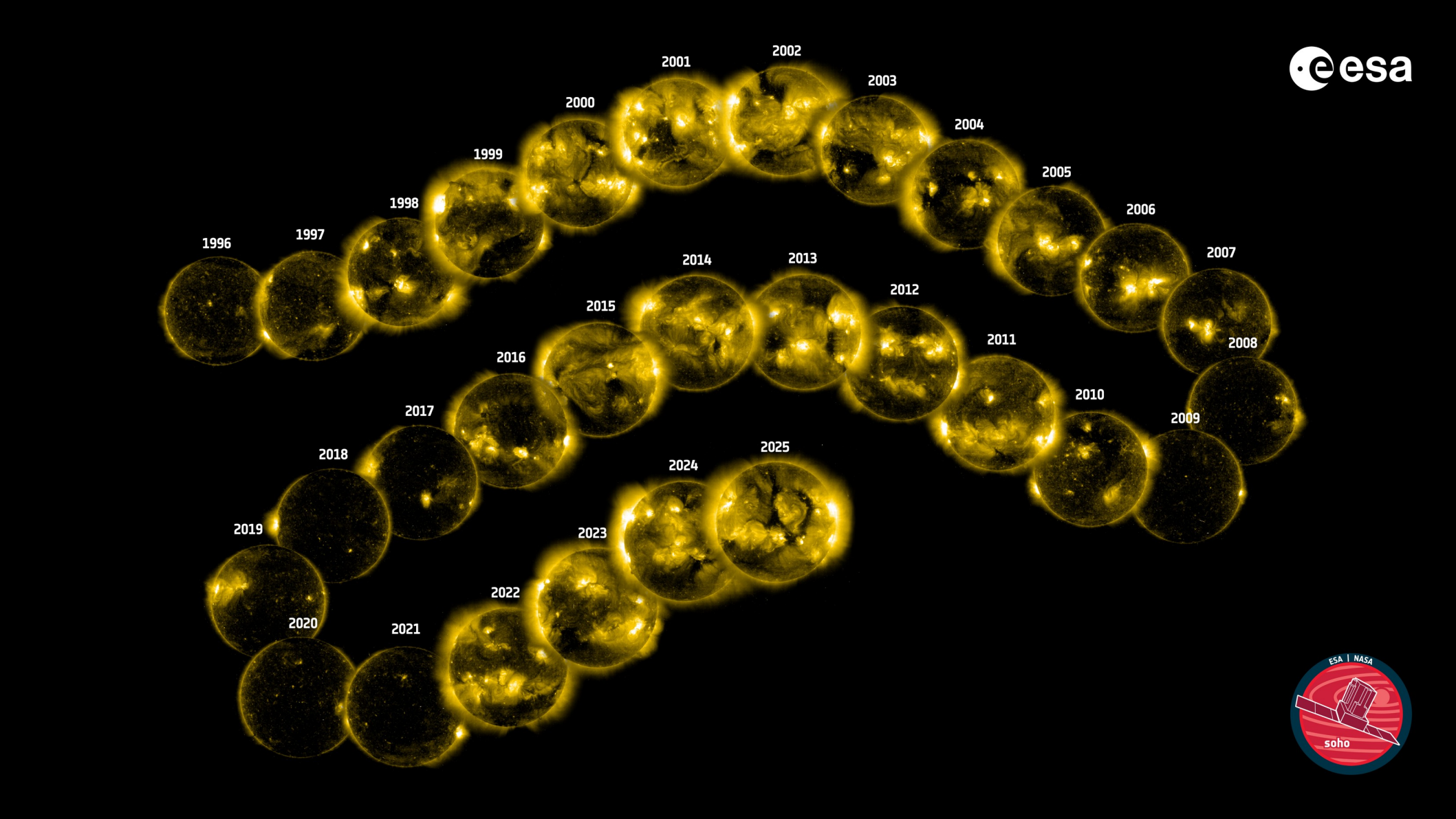




(Kollhoff et al., 2021)



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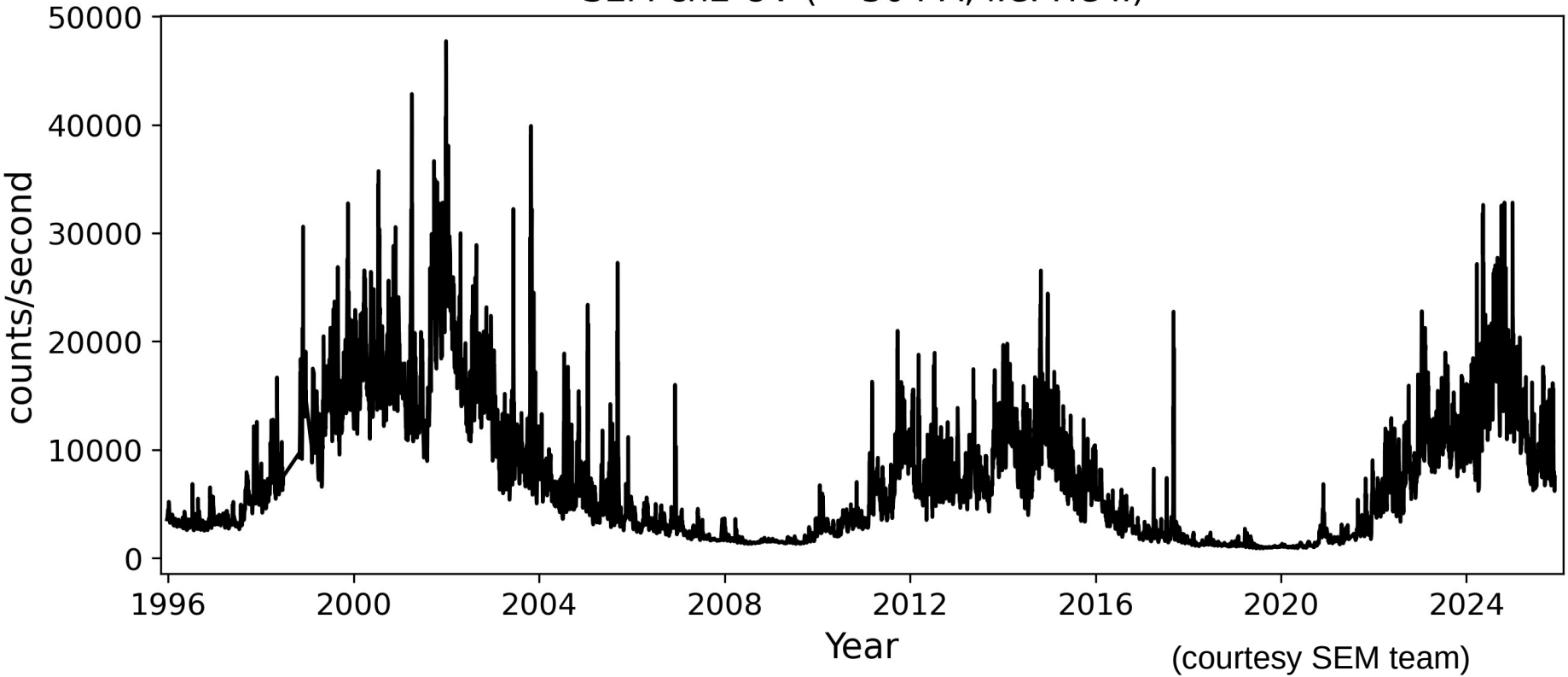
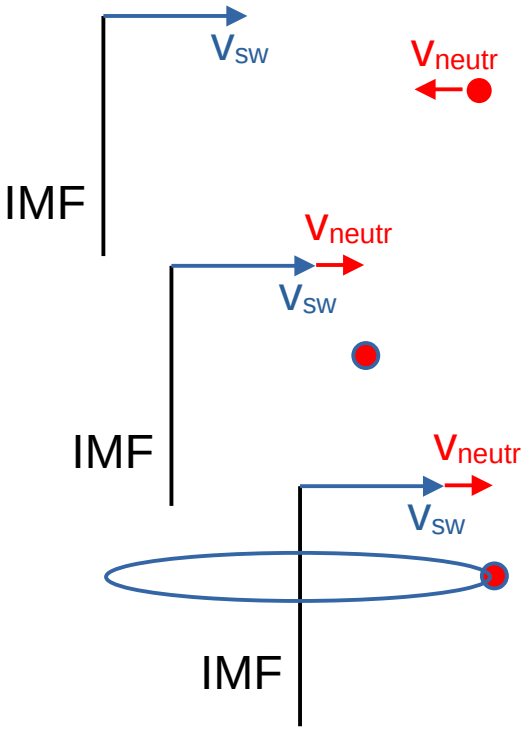
ESA | NASA
soho

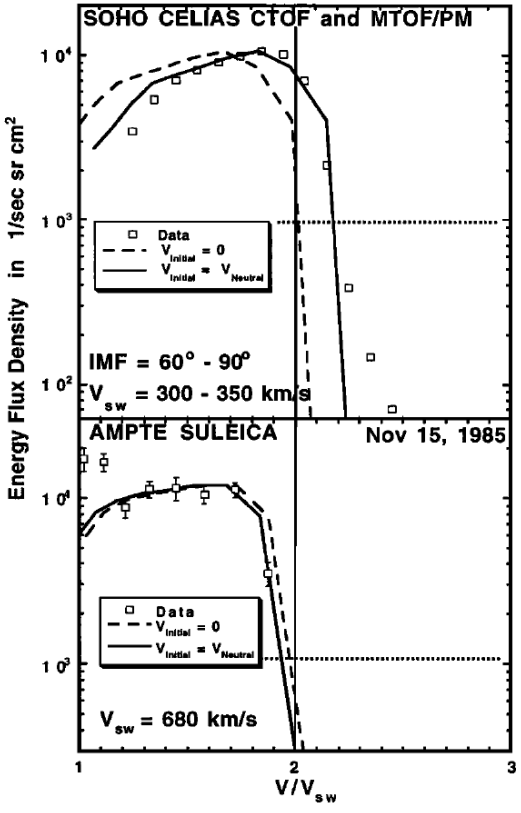
SEM ch2 UV (~ 304 Å, i.e. He II)

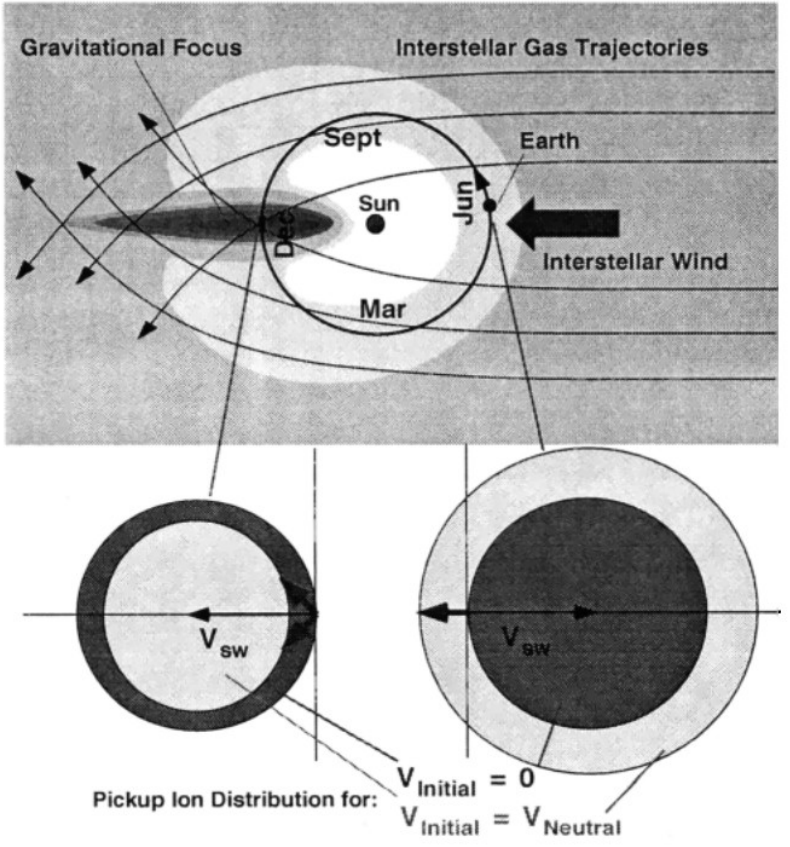


(courtesy SEM team)

Interstellar Pickup Ions

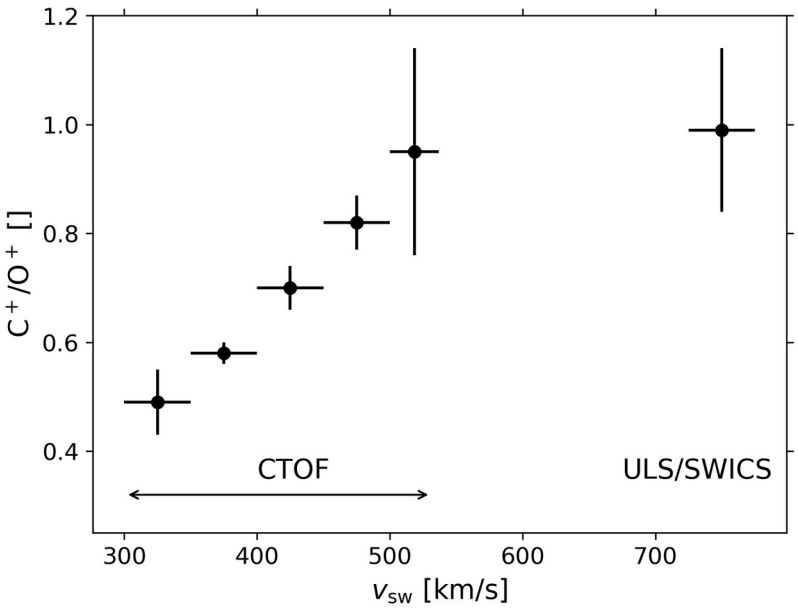


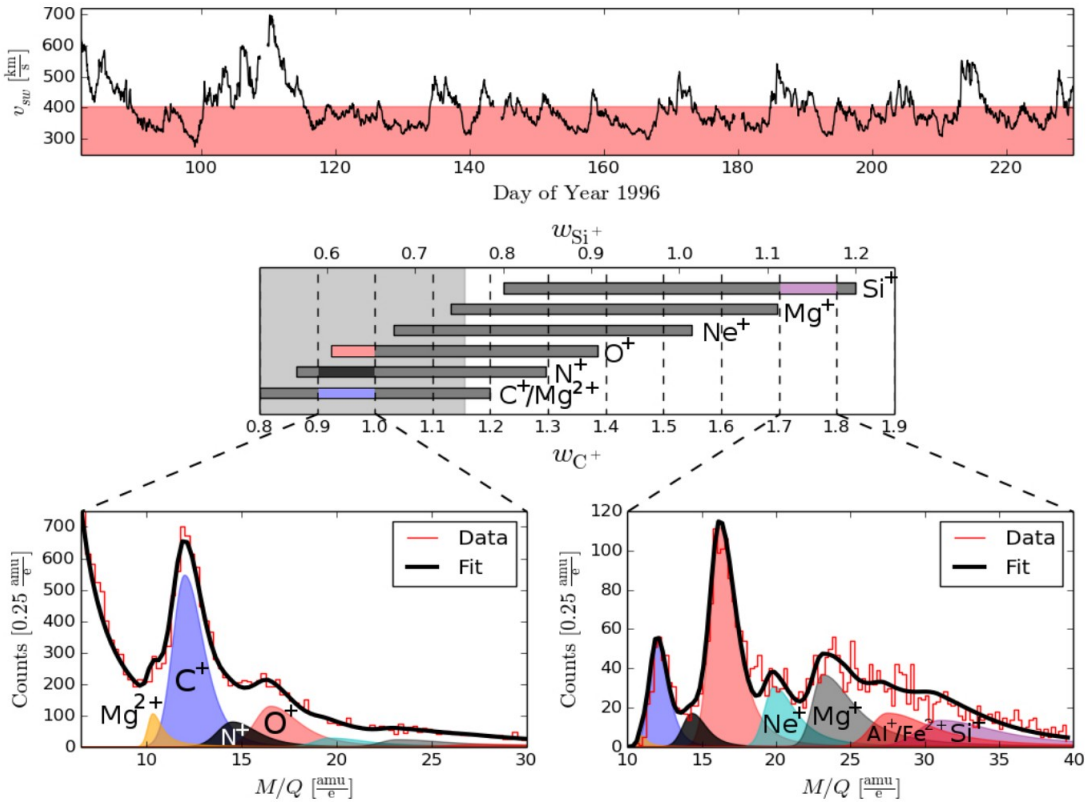




(Möbius et al., 1999)

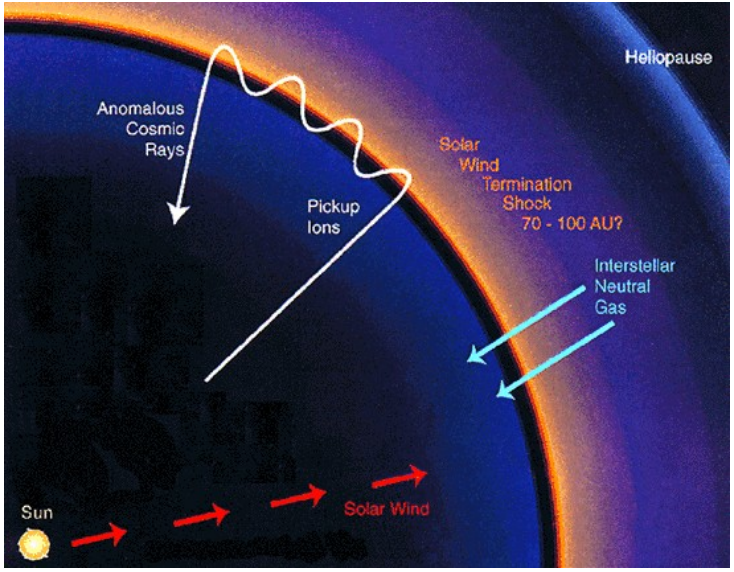
(Inner Source Pickup Ions)





(Taut et al., 2015)

Energetic Neutral Atoms



(NASA)

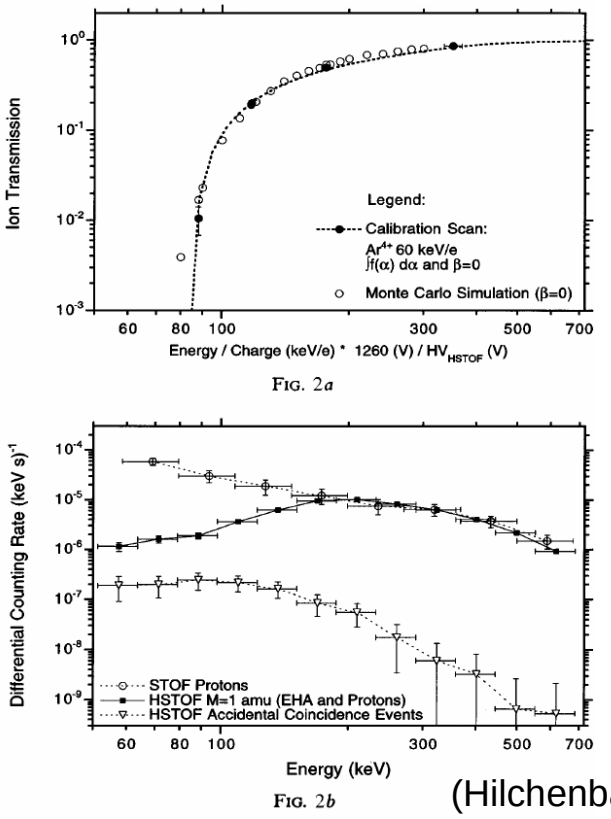


FIG. 2*a*

FIG. 2*b*

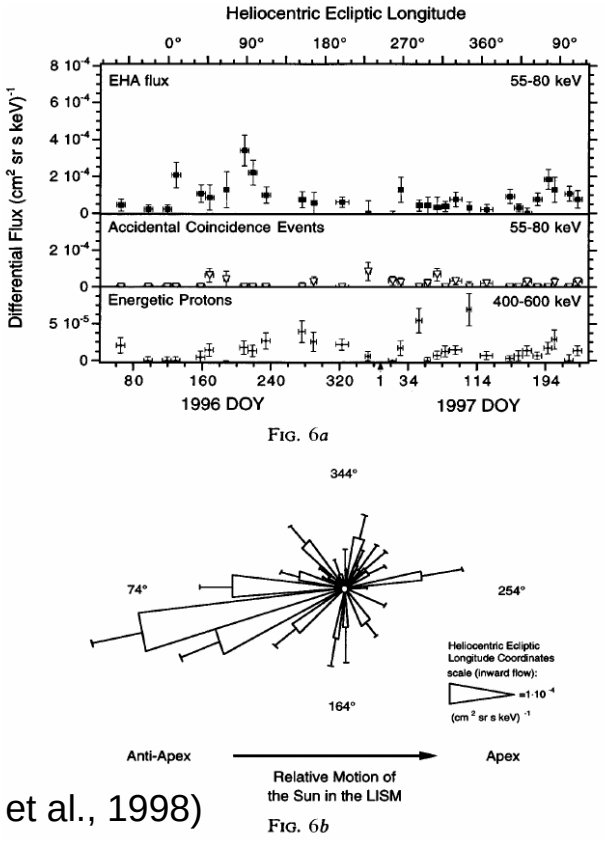


FIG. 6*a*

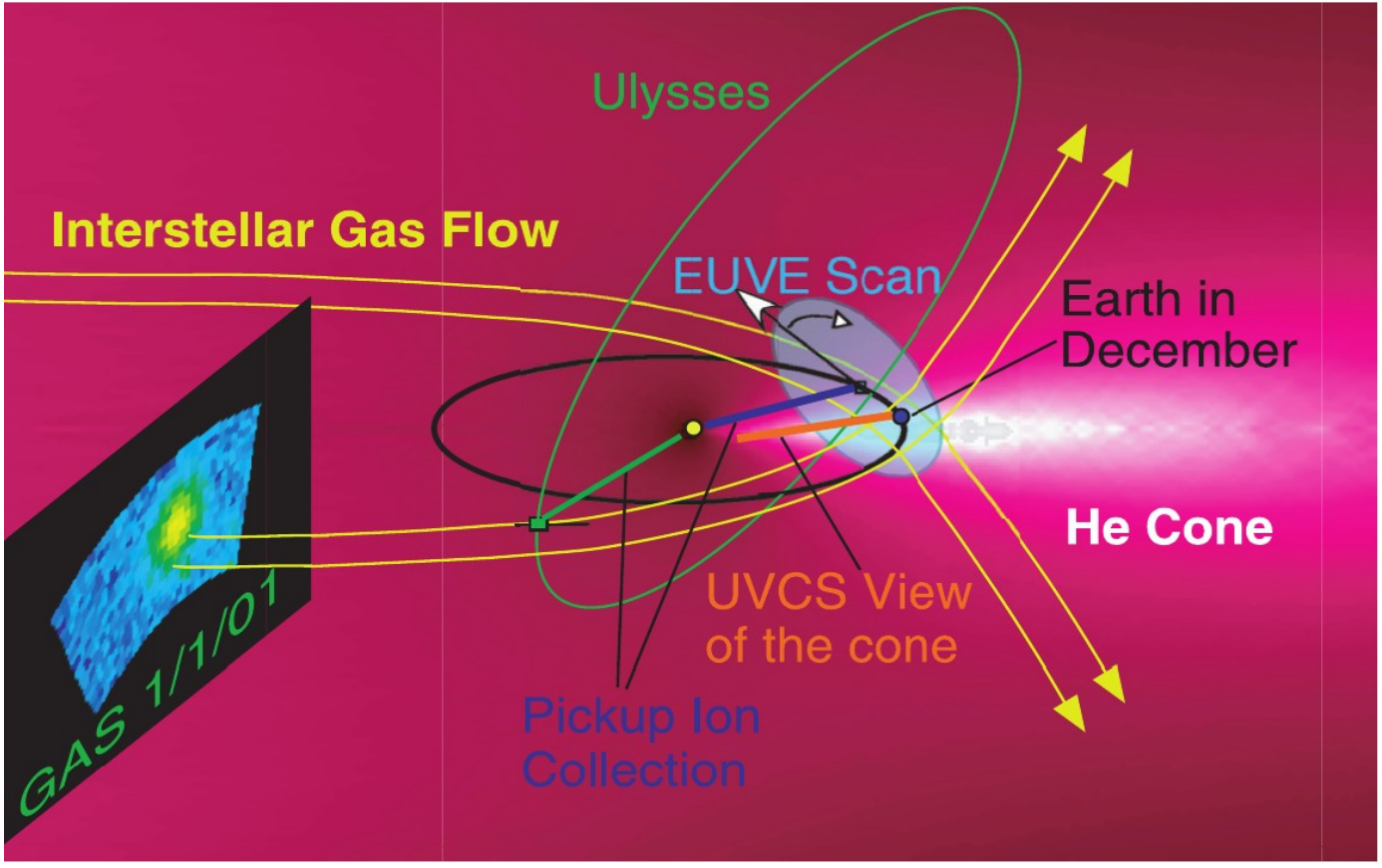
FIG. 6*b*

(Hilchenbach et al., 1998)

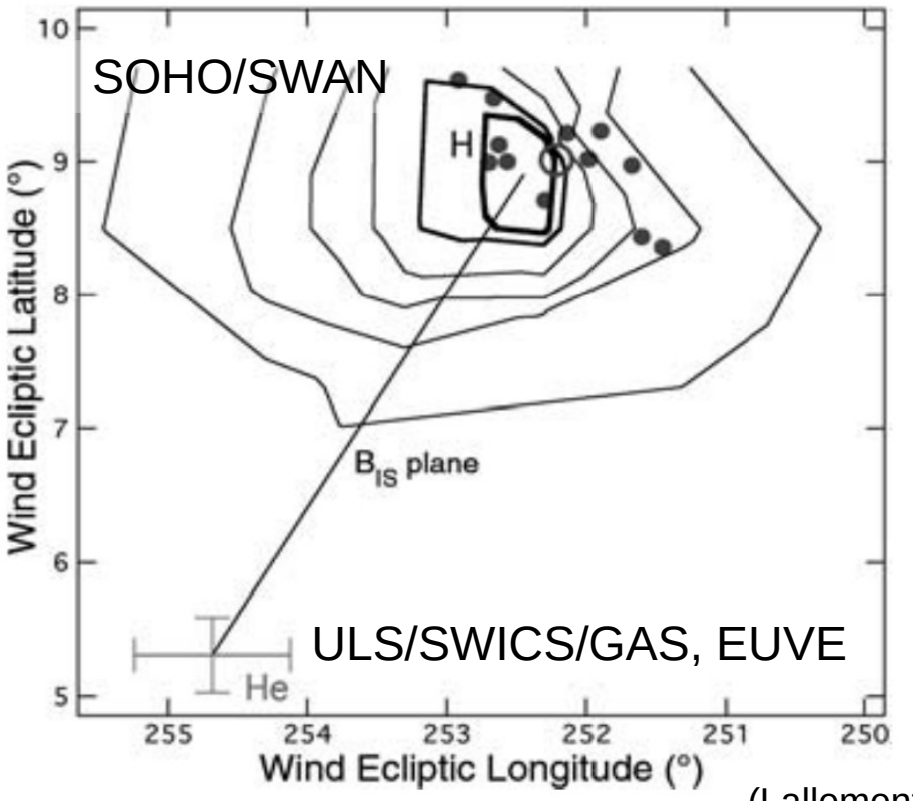
Interstellar medium

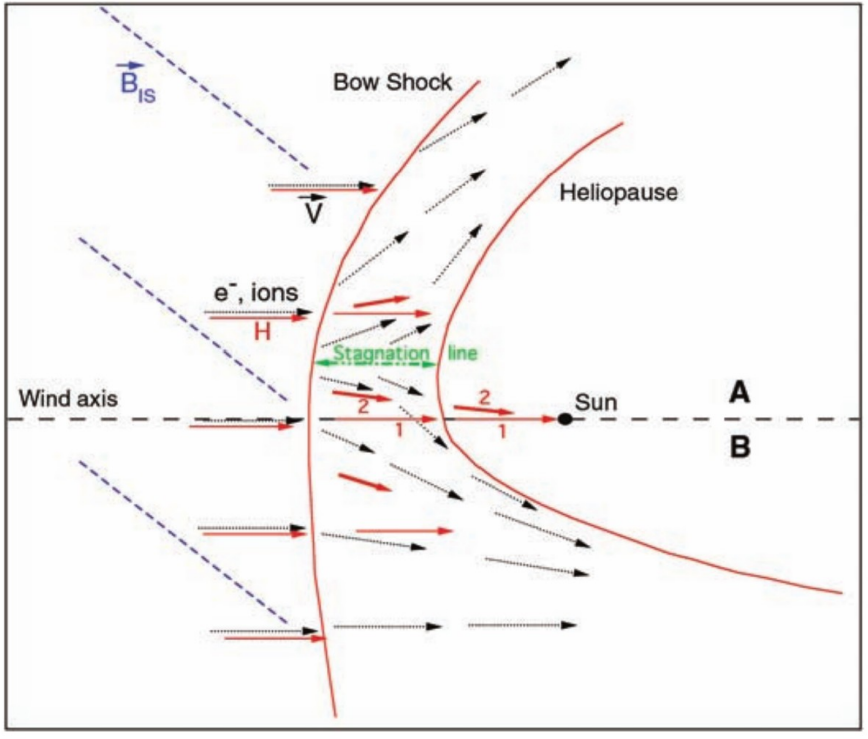
SOHO observations key for understanding interstellar messengers.

But this was only possible by “joining forces”.



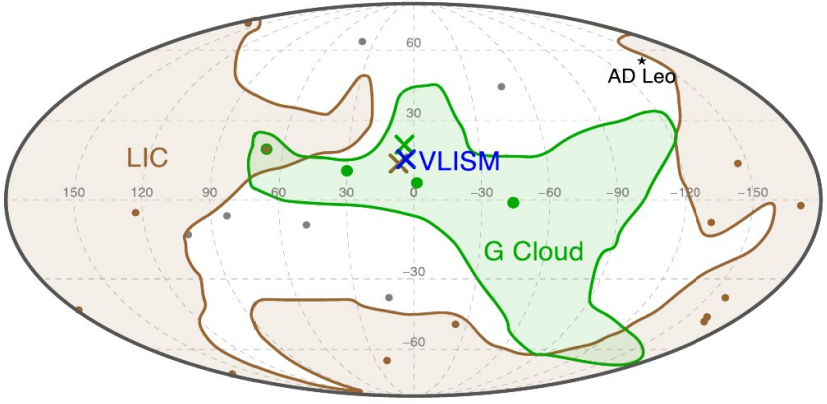
(Möbius et al., 2004)

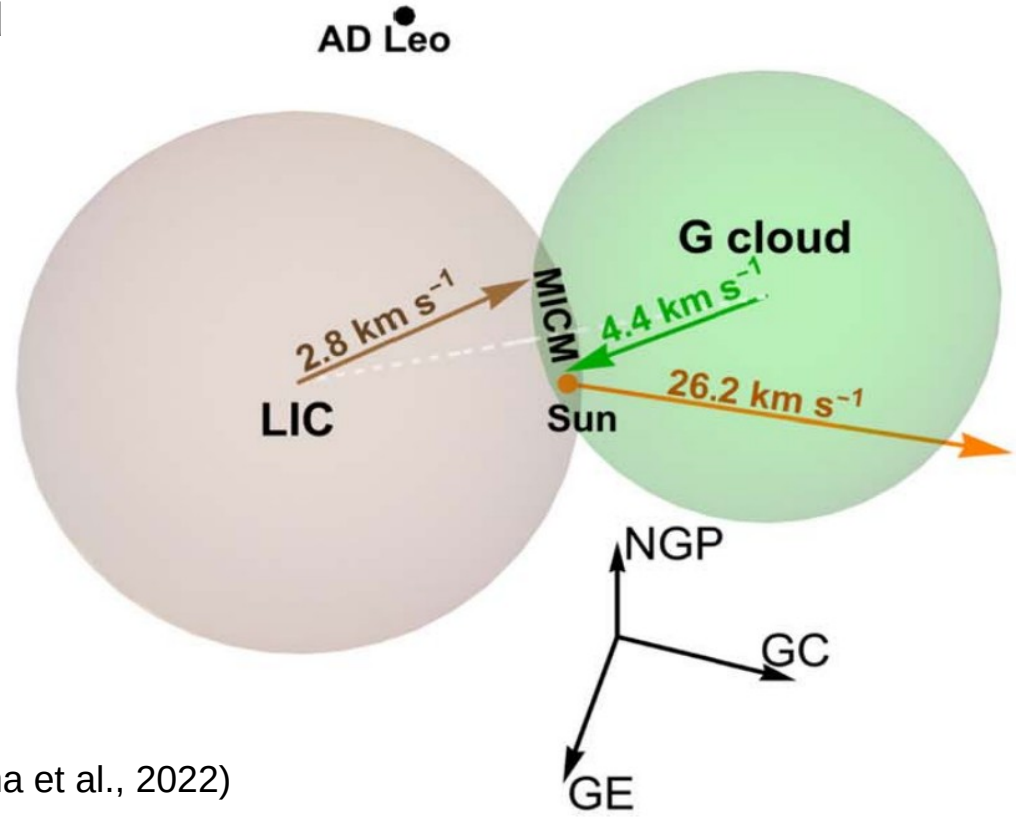




(Lallement et al., 2005)

Our place in the interstellar neighborhood





(Swaczyna et al., 2022)

Summary & Conclusions:

- SOHO is not alone
- SOHO has paved the way for solar, heliospheric, and interstellar science
- SOHO has gone a long way