



What We Think We Know About CIRs/SIRs

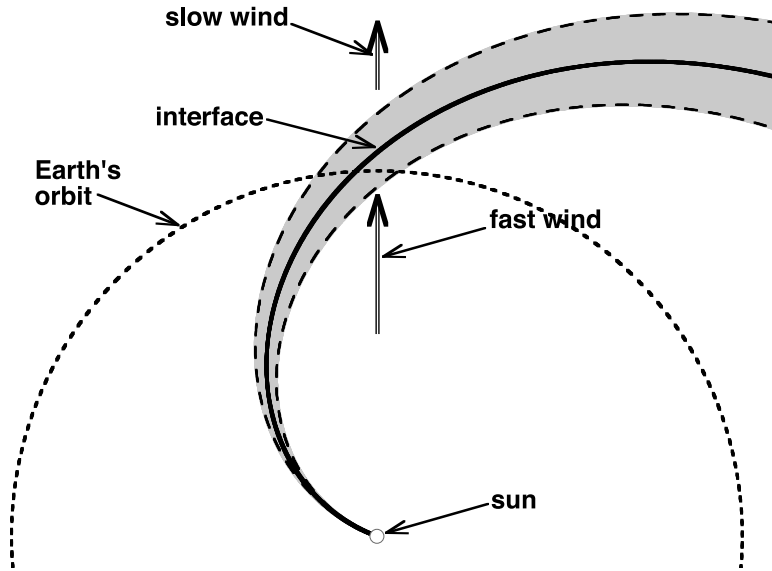
Curt A de Koning



D. Odstrcil, V. Pizzo, C. DeForest, S. Gibson



What is a CIR? A Schematic View

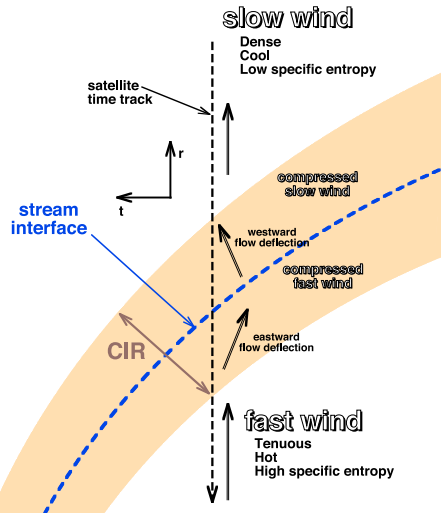


From:
Borovsky &
Denton, 2010.



What is a CIR? A Schematic View

Satellite View in RTN Coordinate System



From:
Borovsky &
Denton, 2010.

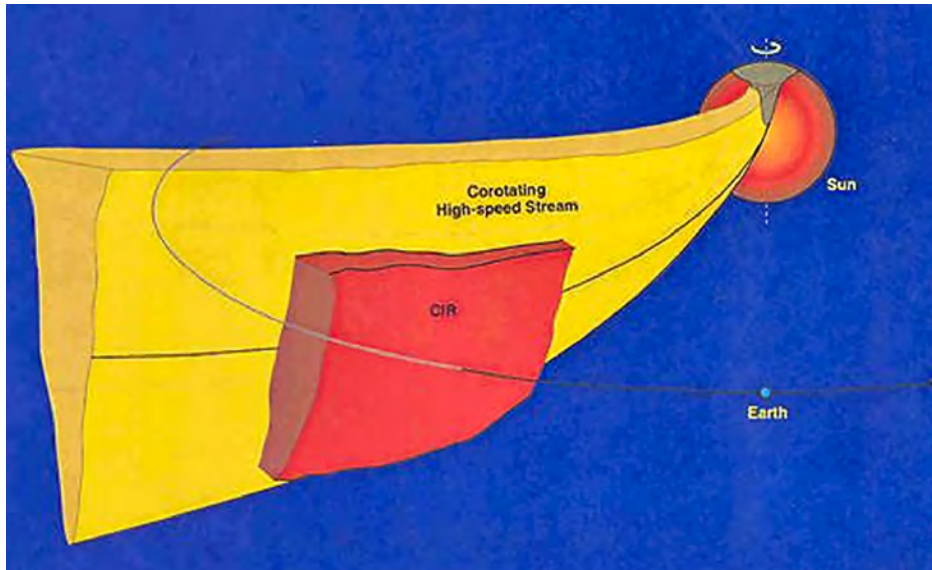


What is a CIR? What is an SIR?

- Is an SIR a rapidly evolving CIR?
- Or is a CIR a steady-state SIR?
- Does it matter?



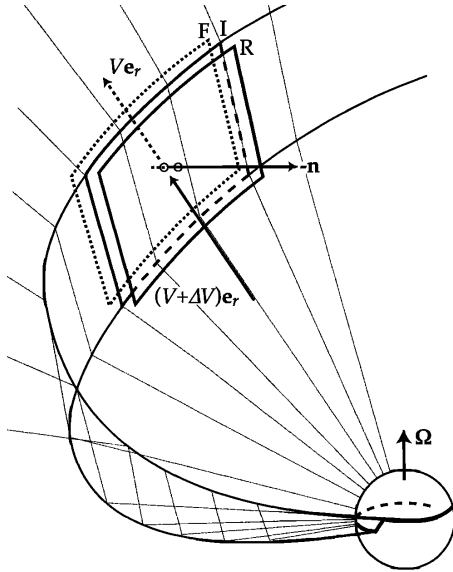
What is a CIR? An "Artist's" View



From:
Tsurutani et al.,
2006.



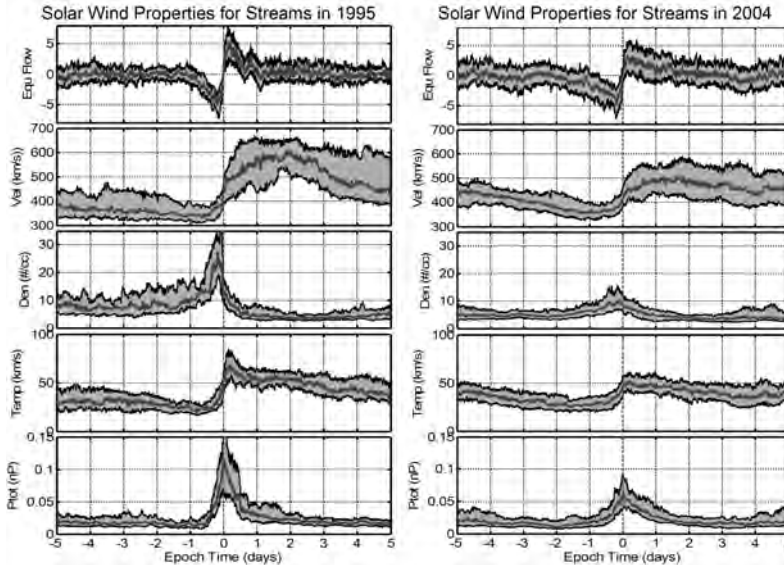
What is a CIR? An Analytical View



From:
Lee, 2000.



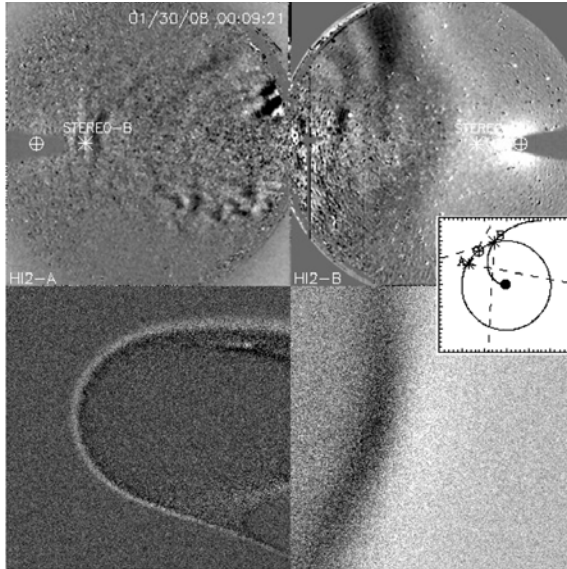
What is a CIR? The In-Situ View



From:
McPherson &
Weygand, 2006.



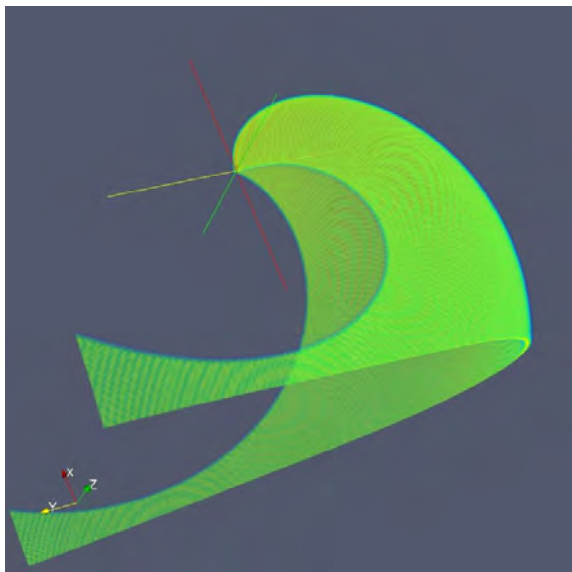
What is a CIR? White-Light View



From:
Wood et al., 2010.



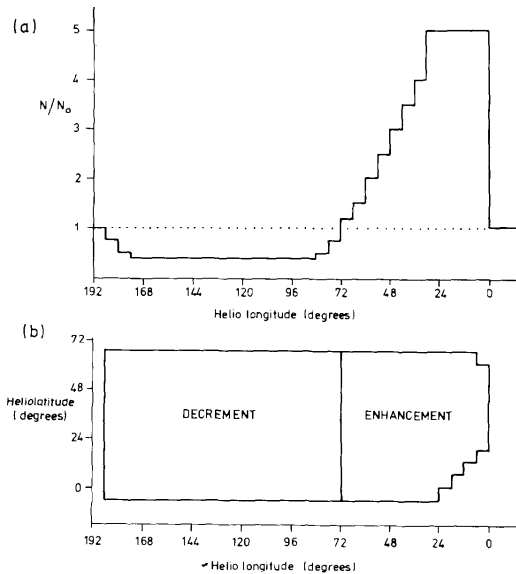
What is a CIR? Reconstruction from White Light



From:
Wood et al., 2010.



What is a CIR? Reconstruction from IPS



From:
Tappin et al.,
1984.



The Observational 'How'

- Much more can be said about CIRs
 - deflections in solar wind flow direction at the stream interface
 - formation and orientation of shock fronts
- Most of what we know has been learned from in-situ measurements
- A recent, thorough review can be found in Richardson [LRSP, 2018]

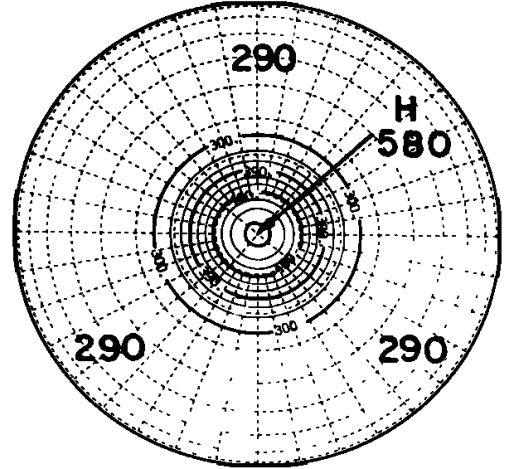
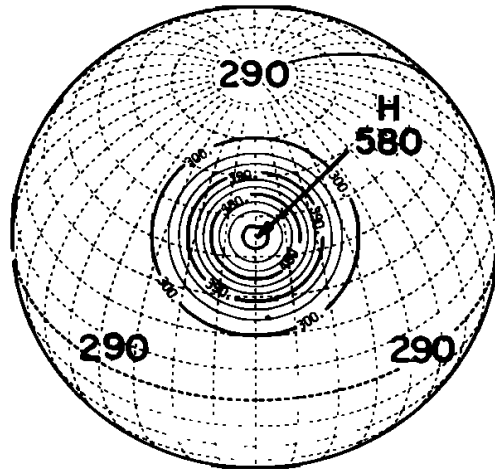
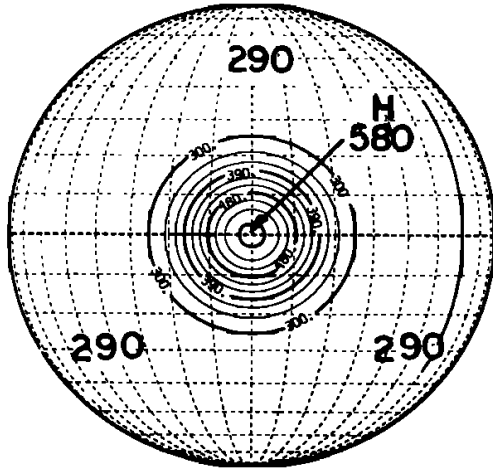


The Observational 'How'

- PUNCH will use remote sensing
- PUNCH will measure scattered brightness from line-of-sight integrated mass
- PUNCH observations will be used to reconstruct the 3D structure of CIRs

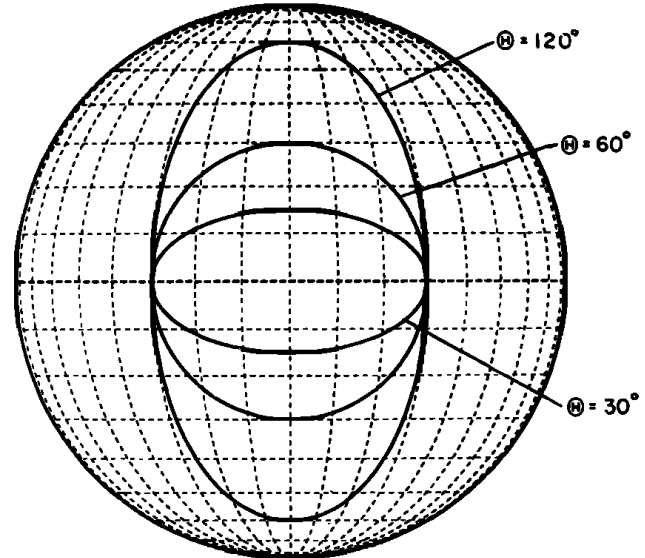
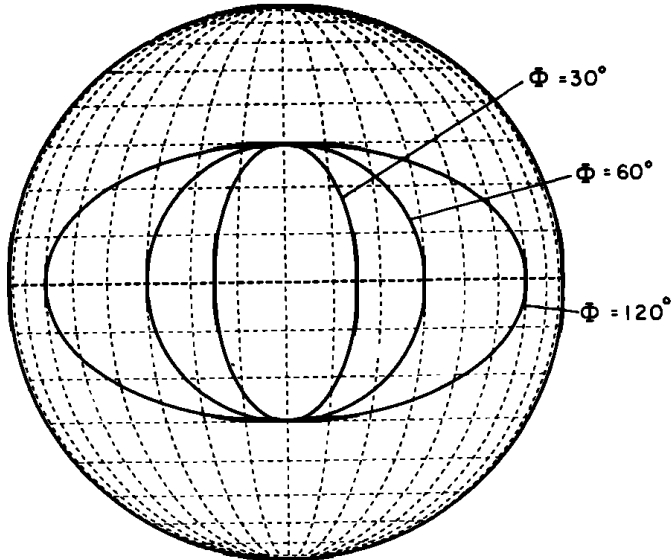


Simple, Ideal Coronal Holes



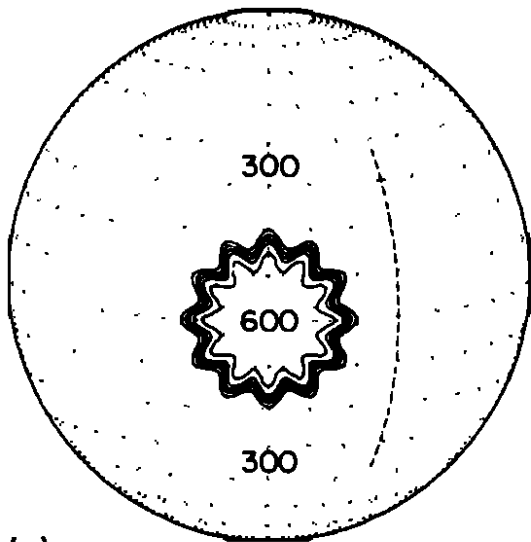


Simple, Ideal Coronal Holes

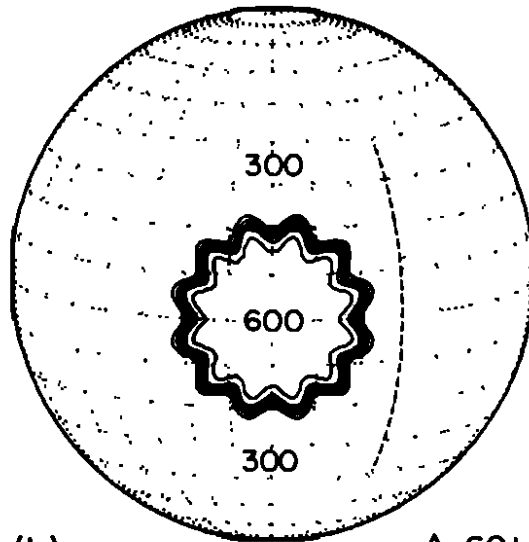




Simple, Ideal Coronal Holes



(a)

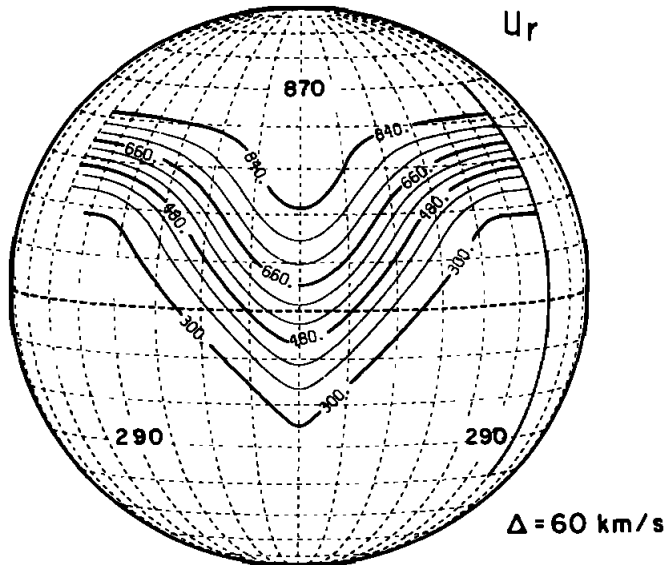


(b)

$\Delta=60 \text{ km/s}$

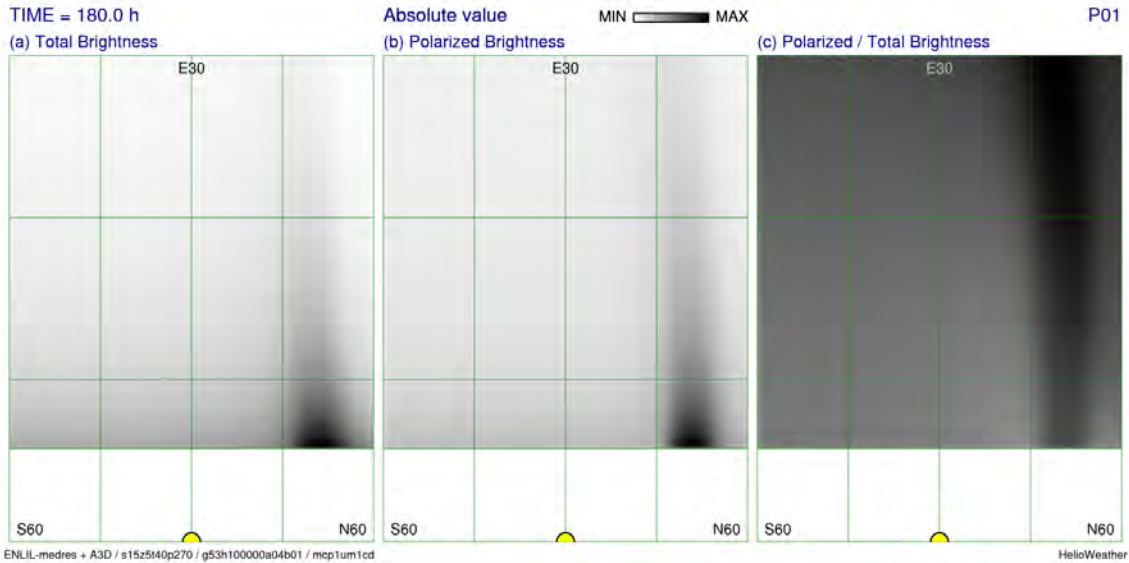


Simple, Ideal Coronal Holes





Synthetic Image



ENLIL-medres + A3D / s15z5f40p270 / g53h100000a04b01 / mcp1um1cd

HelioWeather



Synthetic Movies

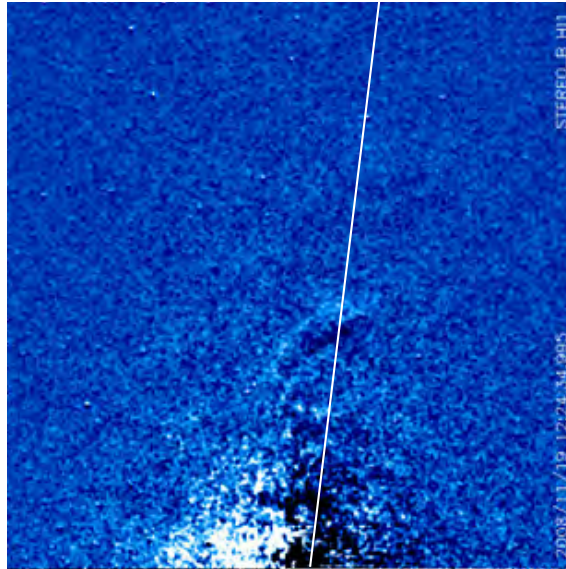
Two movie files can be viewed

- Solar wind from an equatorial circular coronal hole
- Solar wind from a tilted streamer belt

Note: Dark is high brightness; white is low brightness



STEREO Image



2008-11-19 STEREO
observation
From:
Tappin & Howard,
2009.



Conclusion

- PUNCH will provide a new observational perspective on CIRs
- Will PUNCH confirm our understanding of CIRs, tweak our understanding, or revolutionize our understanding?