

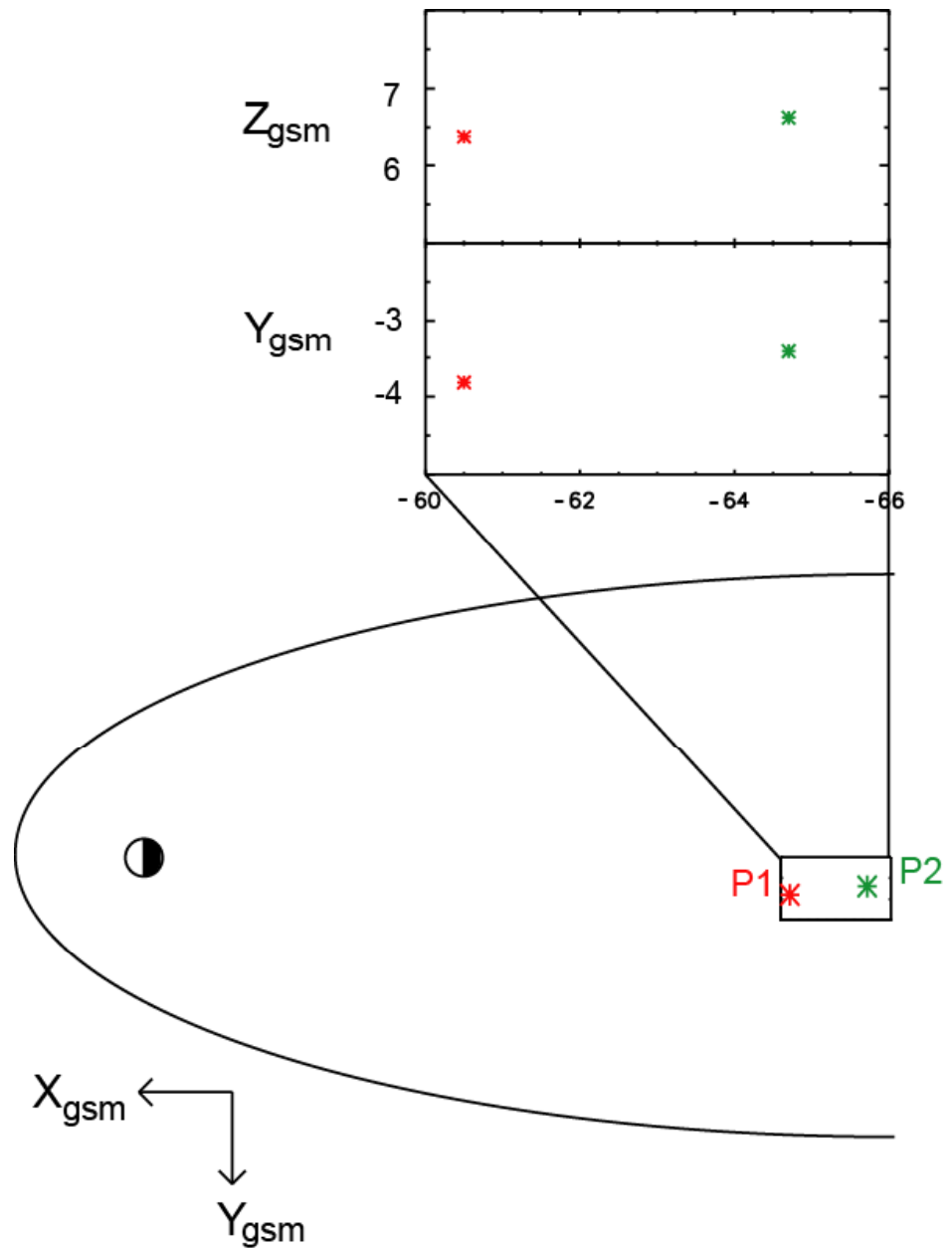
Plasmoid growth and expulsion  
revealed by  
two-point ARTEMIS observations

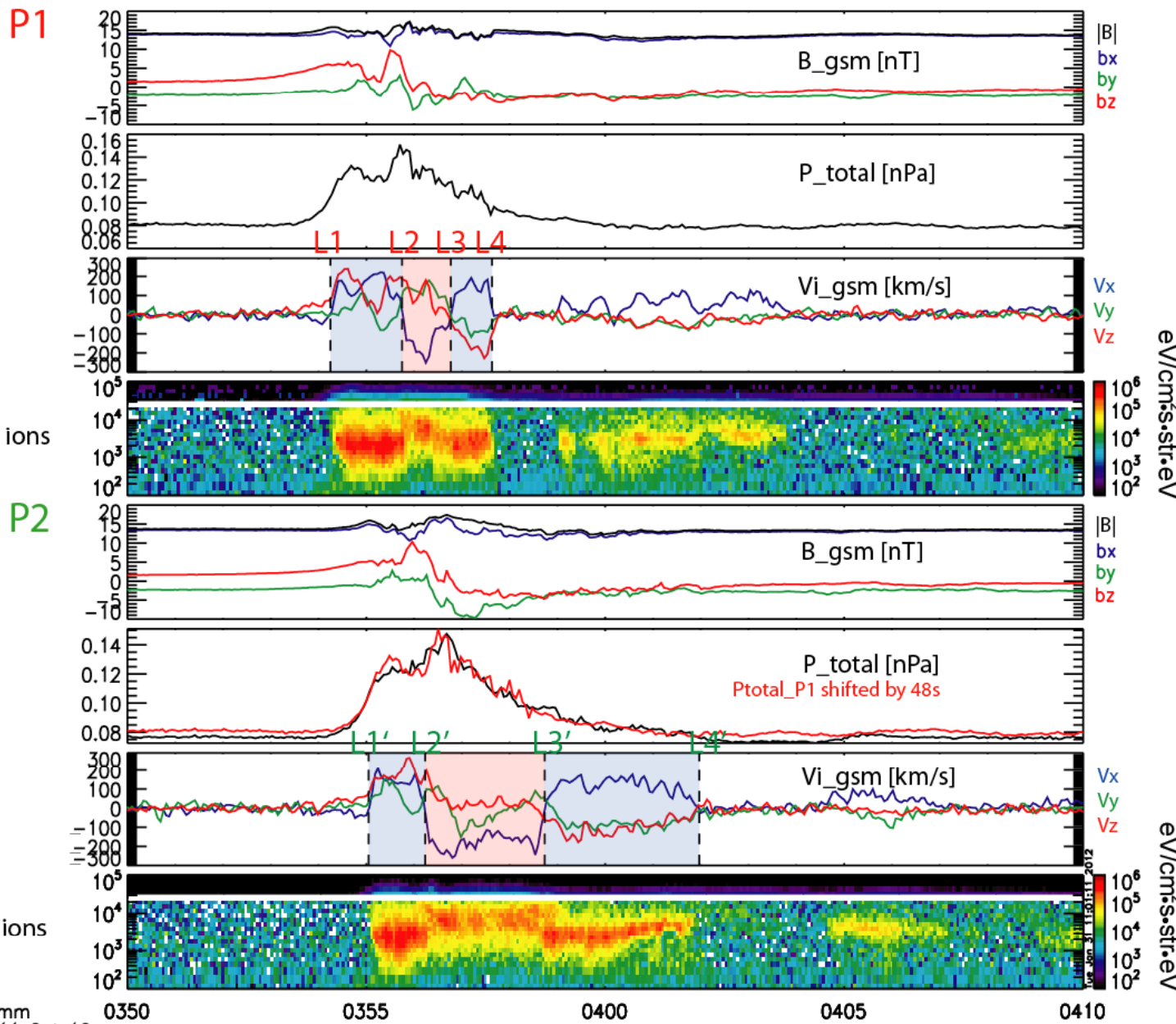
Shanshan Li

03.23.2012

# Locations

- 2011.Oct.12 ~ 04:00UT
- P1(-60.5, -3.8, 6.4)RE ;
- P2(-64.7, -3.4, 6.6)RE
- ~4 RE separation in X
- ~7 RE above neutral sheet





# Summary

## Plot

1) NS Bipolar Bz

2) Pressure enhancement (~40s)

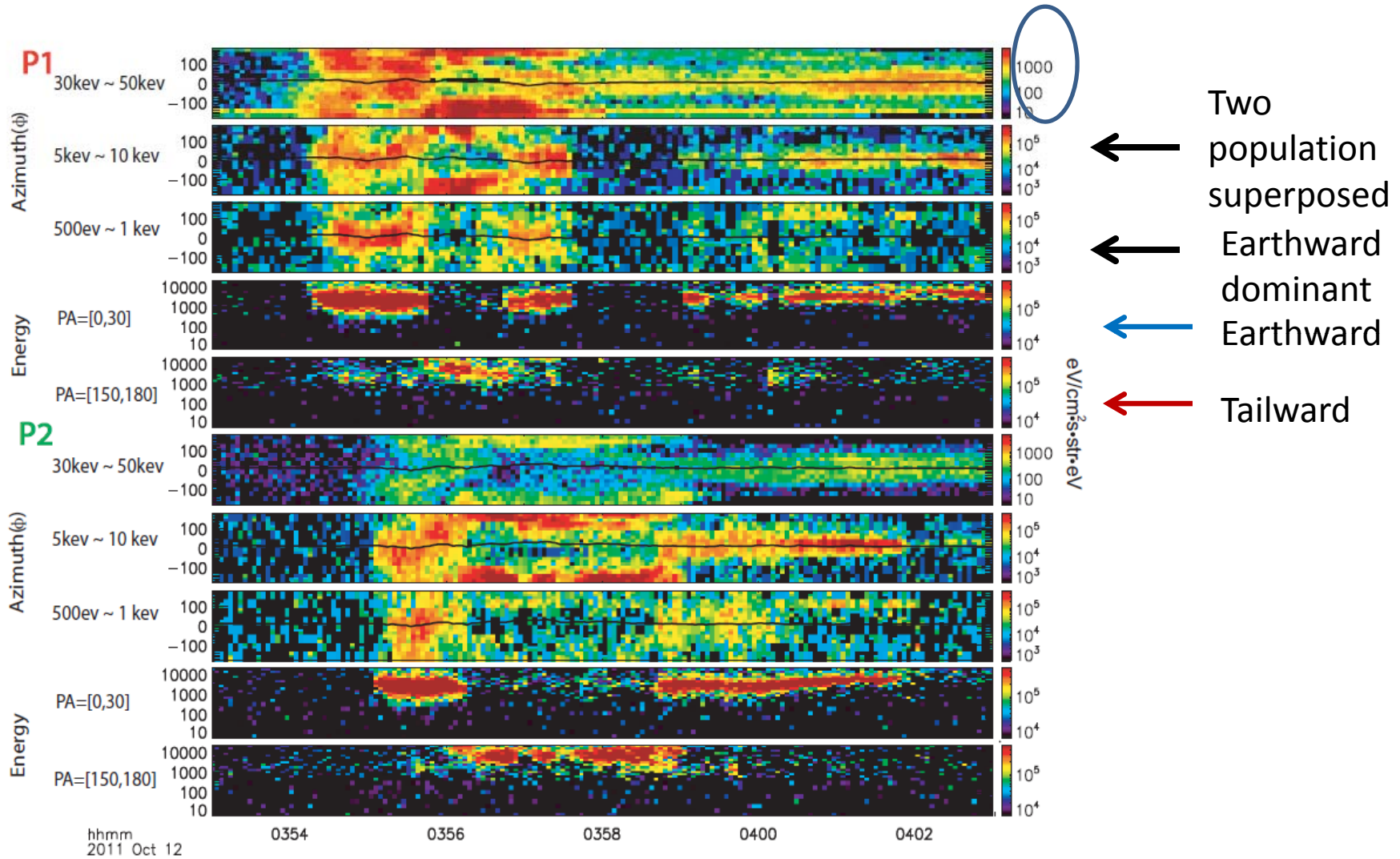
⇒ Propagation speed >500km/s

3) Vx :  
Earthward  
⇒ Tailward  
⇒ Earthward

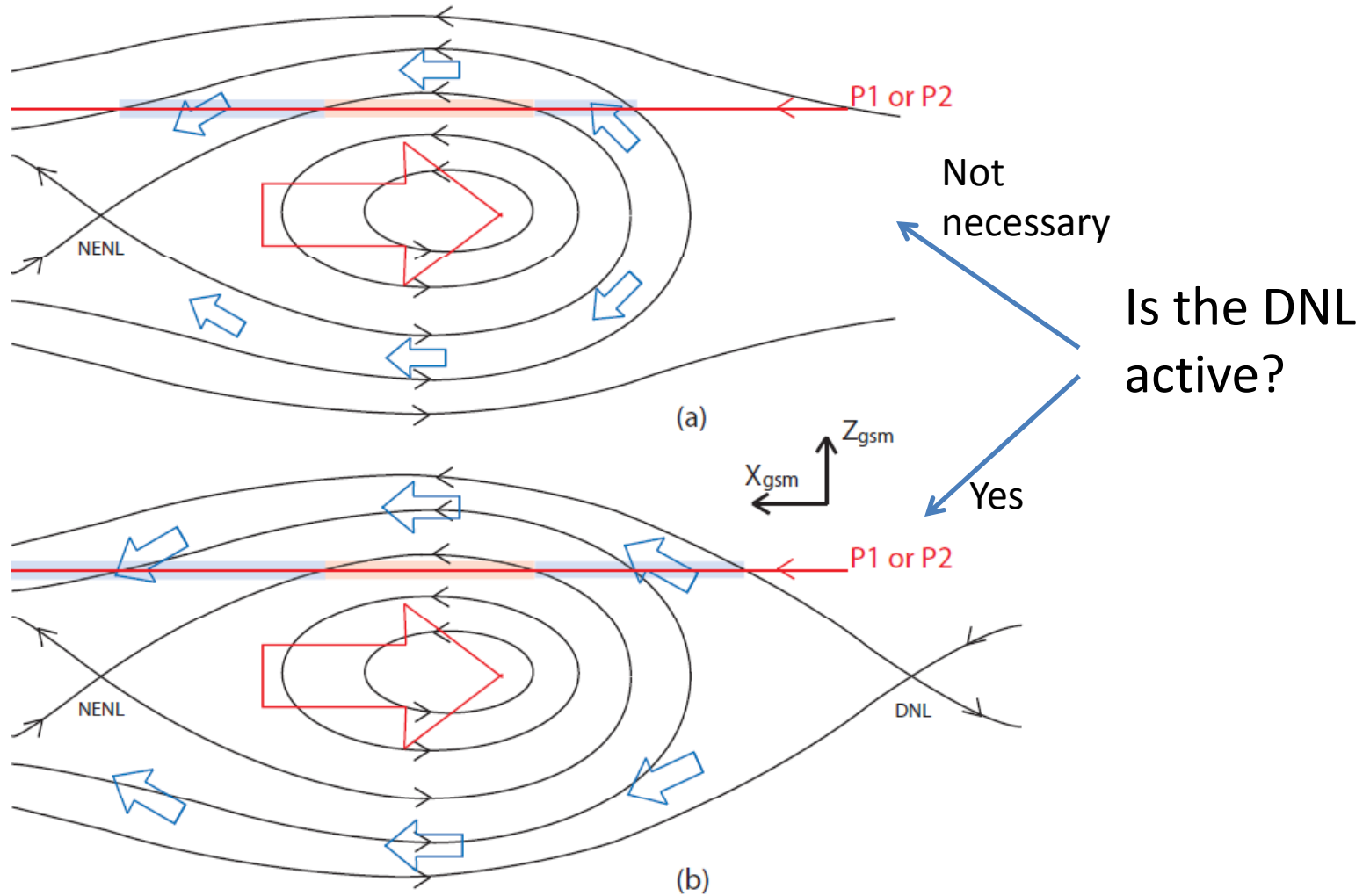
4) Energetic portion in middle

5) Temporal evolution  
⇒ Expansion speed ~7 Re/min (x)

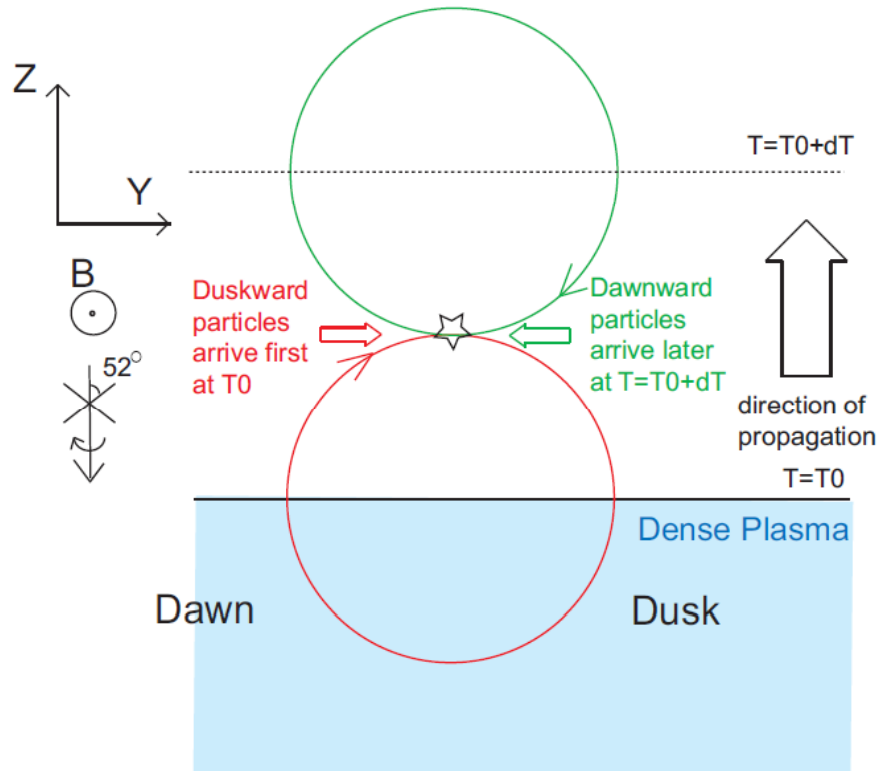
# Structure Details



# Two Interpretations



# Remote Sensing Technique



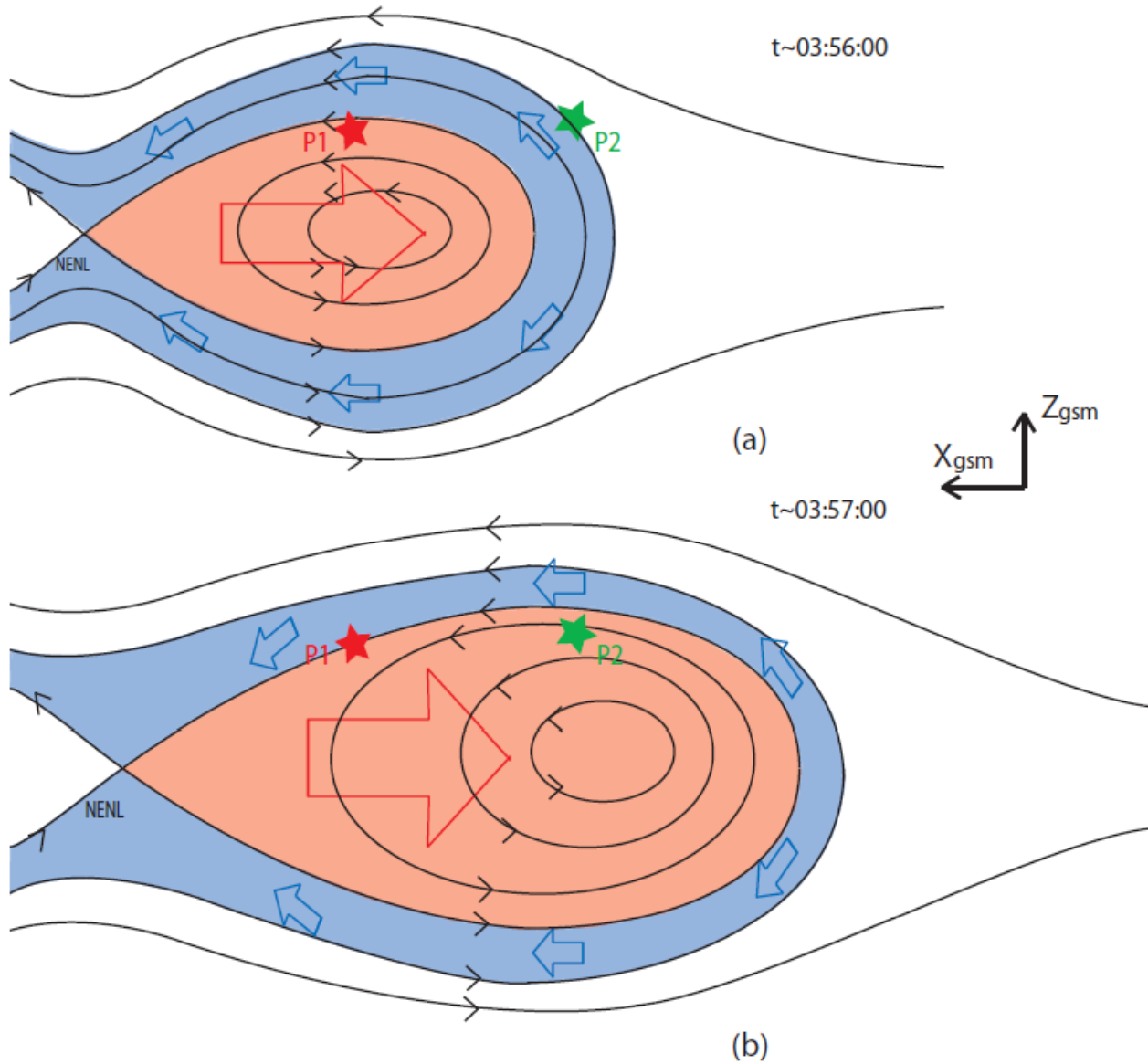
Dusk-dawn time-delay  
 +  
 Gyroradius  
 ⇒ Propagation speed

[ Energetic ions ⇒ boundary propagation  $V_b$  ( $\perp B$ )  
 Local ion bulk velocity  $V_i$  ⇒ structure velocity

- $V_{i\_perp} \sim V_b \sim 150-200 \text{ km/s}$   
 ⇒ Not active

No evidence for  
 active DNL

# Illustration on this Plasmoid Growth



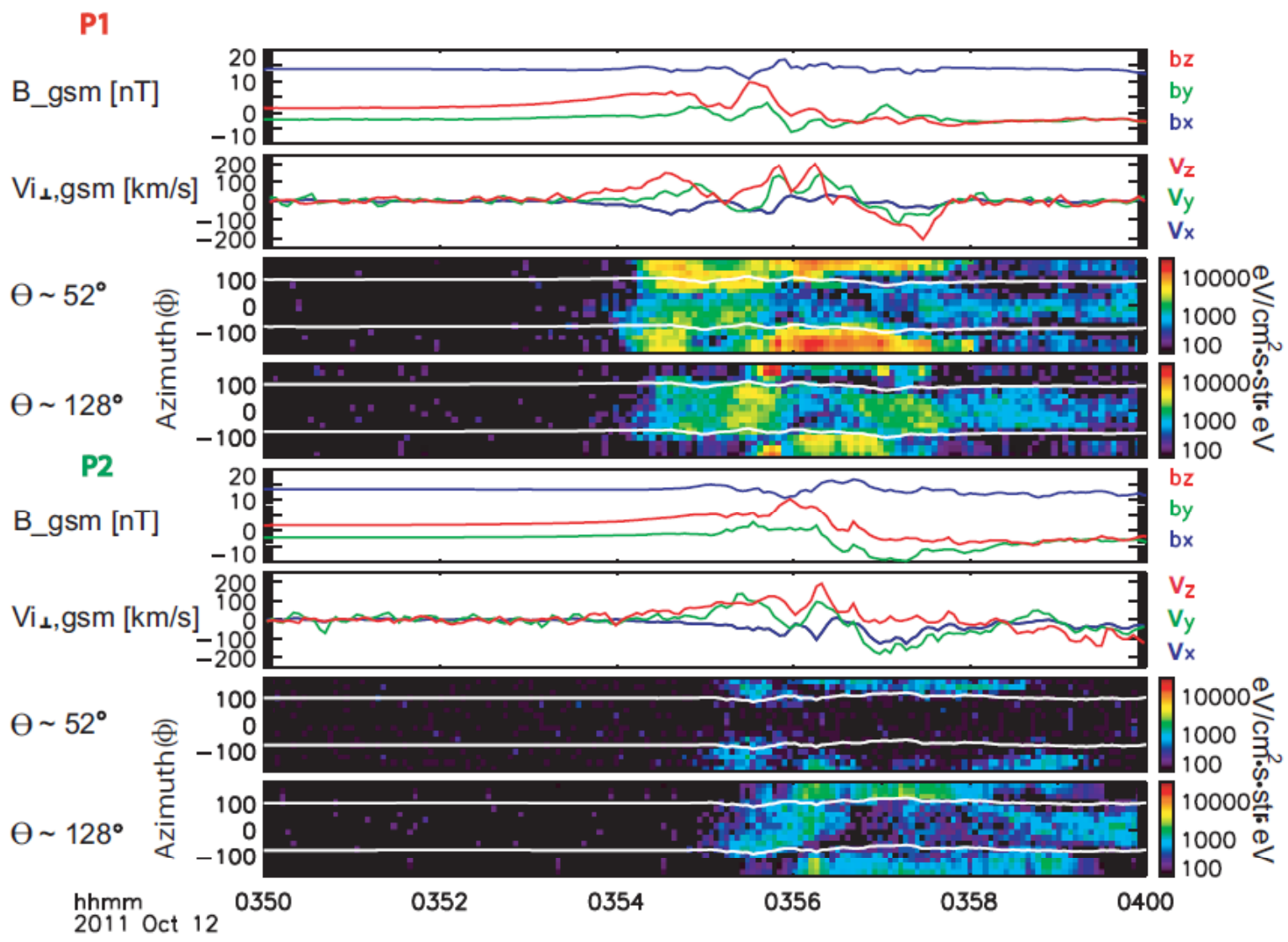
# Summary



- 1) Fast growth rate  $\sim 7\text{Re}/\text{min}$   
(may be still in formation stage)  
@ $x \sim -60\text{Re}$  and  $7\text{Re}$  above neutral sheet
- 2) Propagation in high speed  
( $>500\text{km/s}$ ,  $\sim 0.7 V_{\text{alfven}}$ )  
without lobe reconnection
- 3) Propagation speed  $>$  local plasma bulk speed  
 $\Rightarrow$  Propagating like wave
- 4) Compression ahead of the structure



End

Thank you!



| Table1                   | P1<br>observati<br>on time | Time interval<br>between two<br>P1 Tcharacter s                                                          | P2<br>observation<br>time | Time interval<br>between two<br>P2 Tcharacter s                                                               | P1-P2<br>time<br>delay | Time- delay Velocity |
|--------------------------|----------------------------|----------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------|------------------------|----------------------|
| L1. Vx starts positive   | 03:54:15                   | <br>90 s<br>61s<br>52s | 03:55:03                  | <br>71 s<br>150s<br>194 s | 48 s                   | 560km/s              |
| L2. Vx turns to negative | 03:55:45                   |                                                                                                          | 03:56:14                  |                                                                                                               | 29 s                   | 920km/s              |
| L3. Vx backs to positive | 03:56:46                   |                                                                                                          | 03:58:44                  |                                                                                                               | 118 s                  | 230 km/s             |
| L4. Vx goes to zero      | 03:57:38                   |                                                                                                          | 04:01:58                  |                                                                                                               | 220 s                  | 120 km/s             |