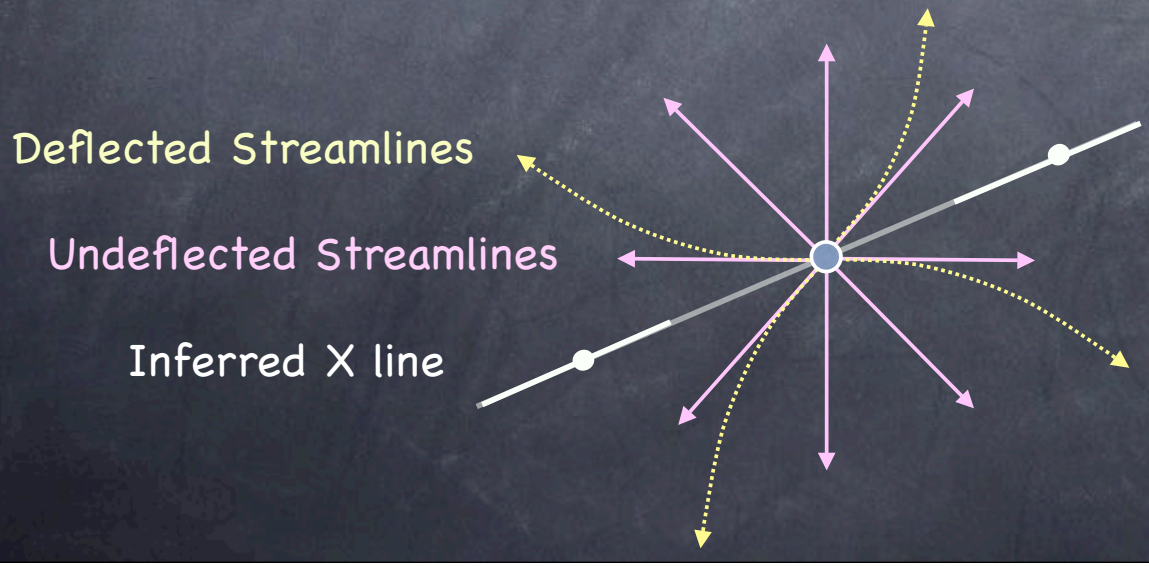
Method

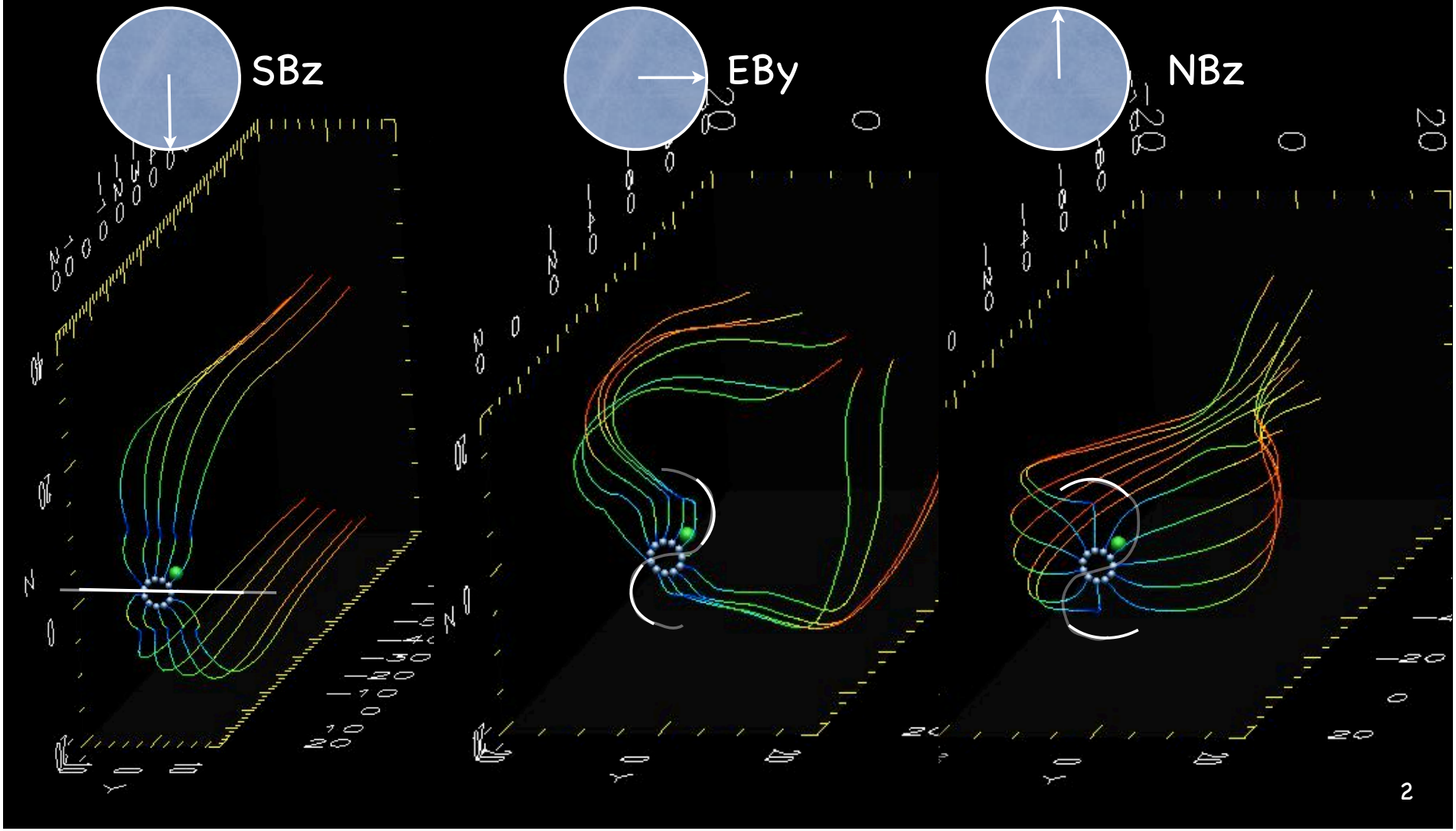
- Visualize the flow streamlines in LFM
- Use three simulations
  - SBz, one for EBy, one for NBz
- Look at near-axial dayside streamlines:
  - When deflected away from otherwise radial divergent flow, infer Maxwell repulsion from X line, with local concentrations



Subsolar Magnetopause

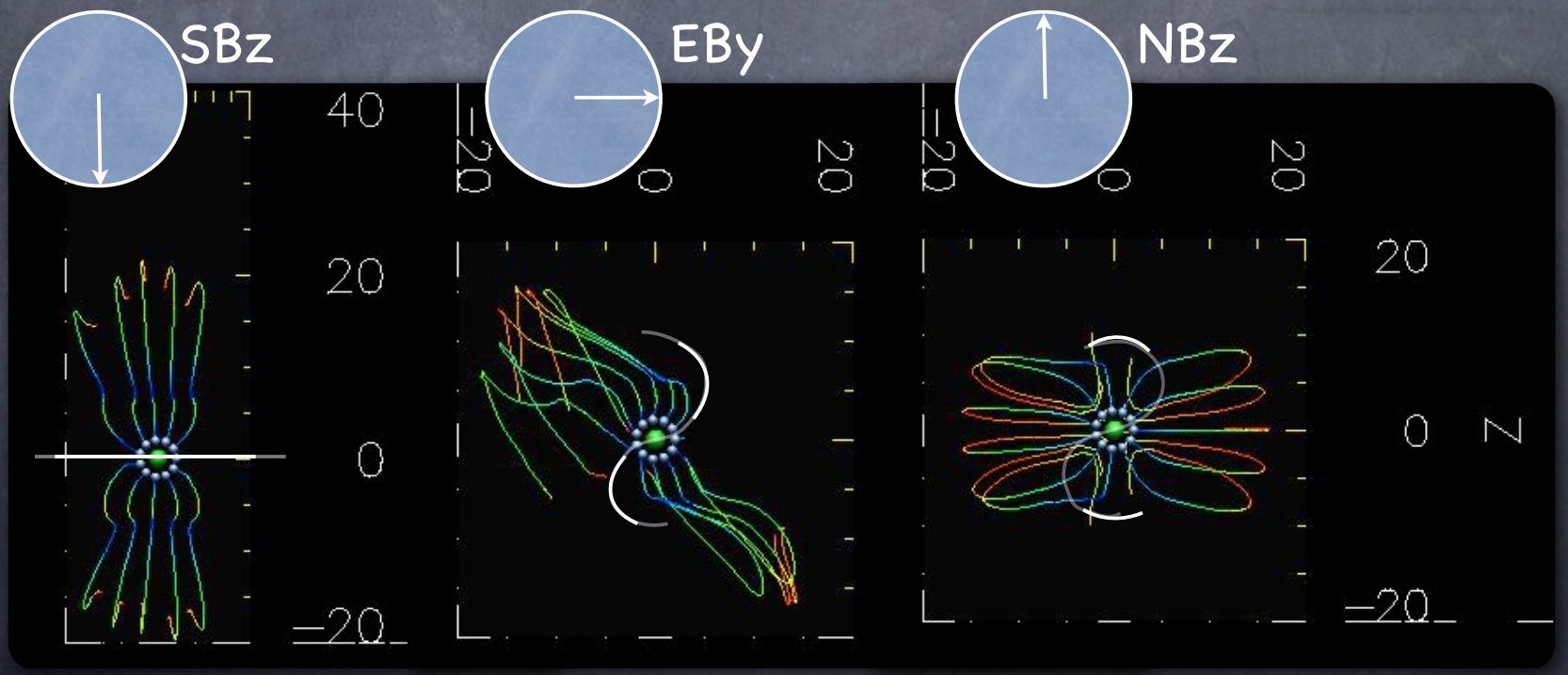
Dayside Reconnection in LFM vs IMF Clock Angle

- Near axial flow streamlines reveal X line (drawn in)



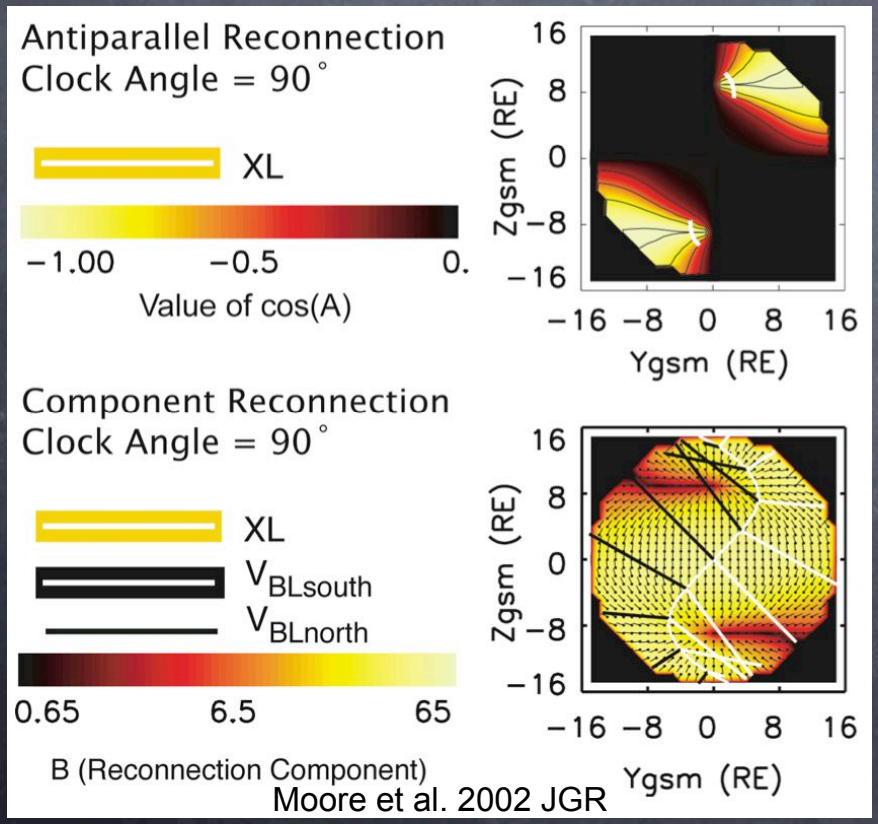
Dayside Reconnection in LFM vs IMF Clock Angle

- Near axial flow streamlines reveal X line as curve
- White segments -> higher reconnection rate
  - Greater Maxwell repulsion from the line

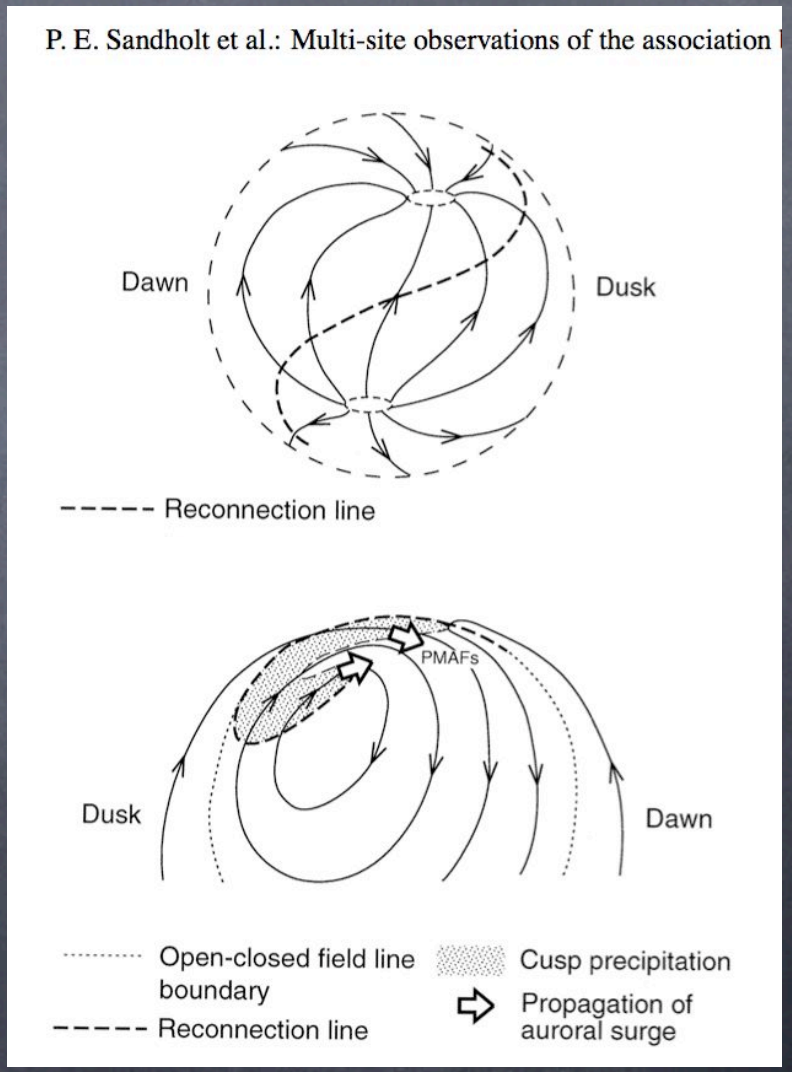


S or Z Shaped "X curve"

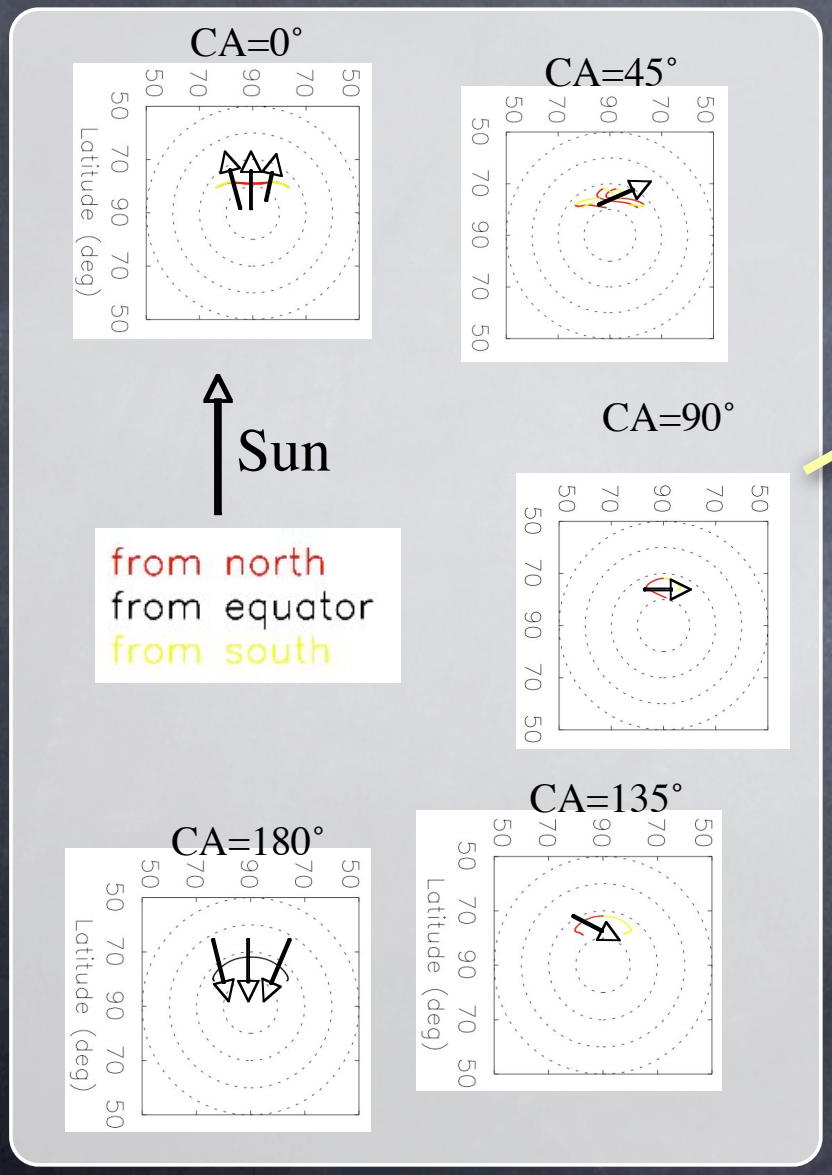
- Theory and observation point to S or Z shaped X curve crossing antiparallel ridges at right angles

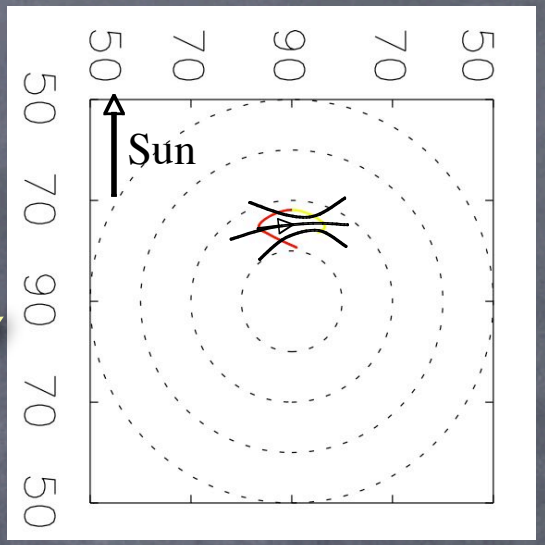


Moore et al. 2002 JGR



Ionospheric Footprint





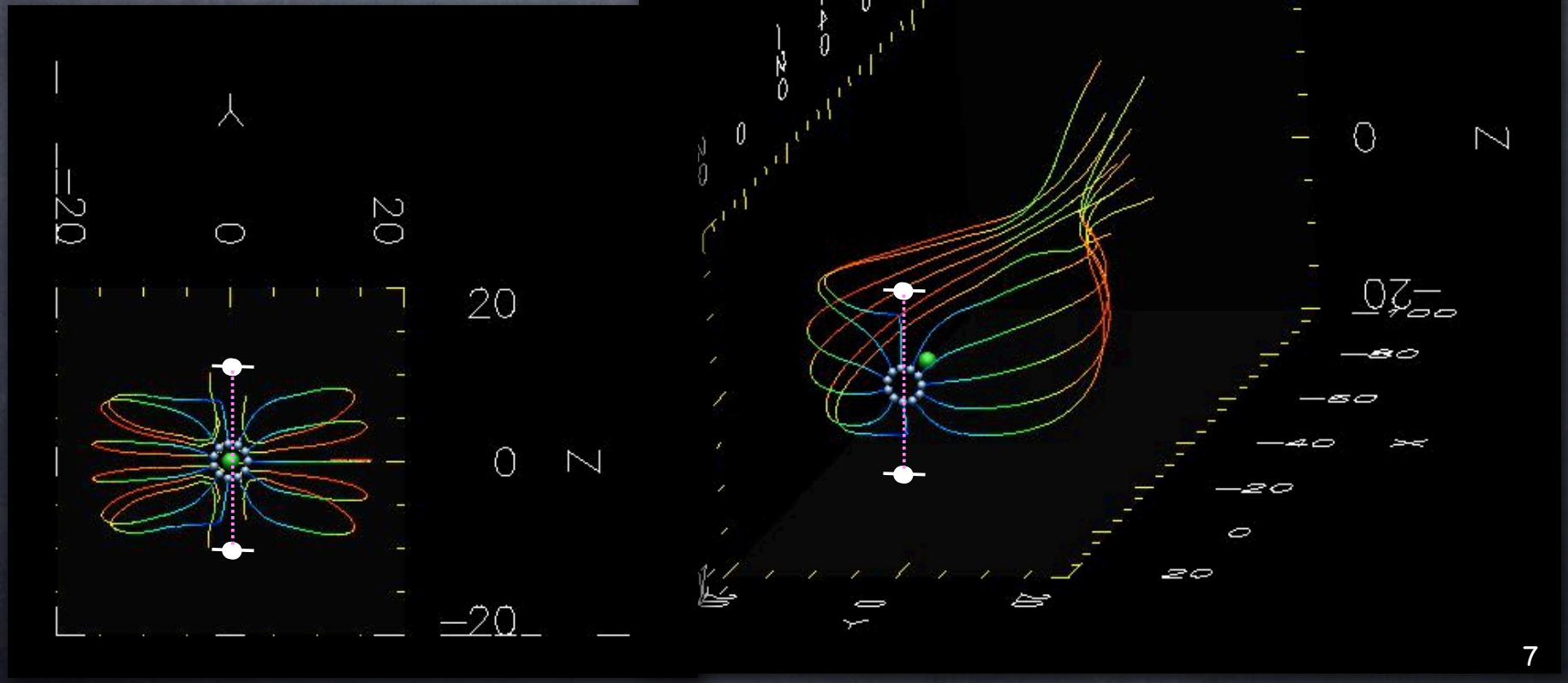
- X curve maps to reconnection "nozzles", producing "throat" flow channels, observed for EBy or WBy and SBz
- Point reconnection produces vortex pair, observed for NBz

Future Directions

- Investigate intermediate clock angle cases, with more streamlines
- Use cases with significant tilt for seasonal effects
  - Efficiency of reconnection vs season?
- Analyze required rate vs distance along X curve
  - Max on antiparallel ridges or at nullfield sites;
  - Trattner et al. 2006 observations offer guidance
  - Compare with simulated rate dependence

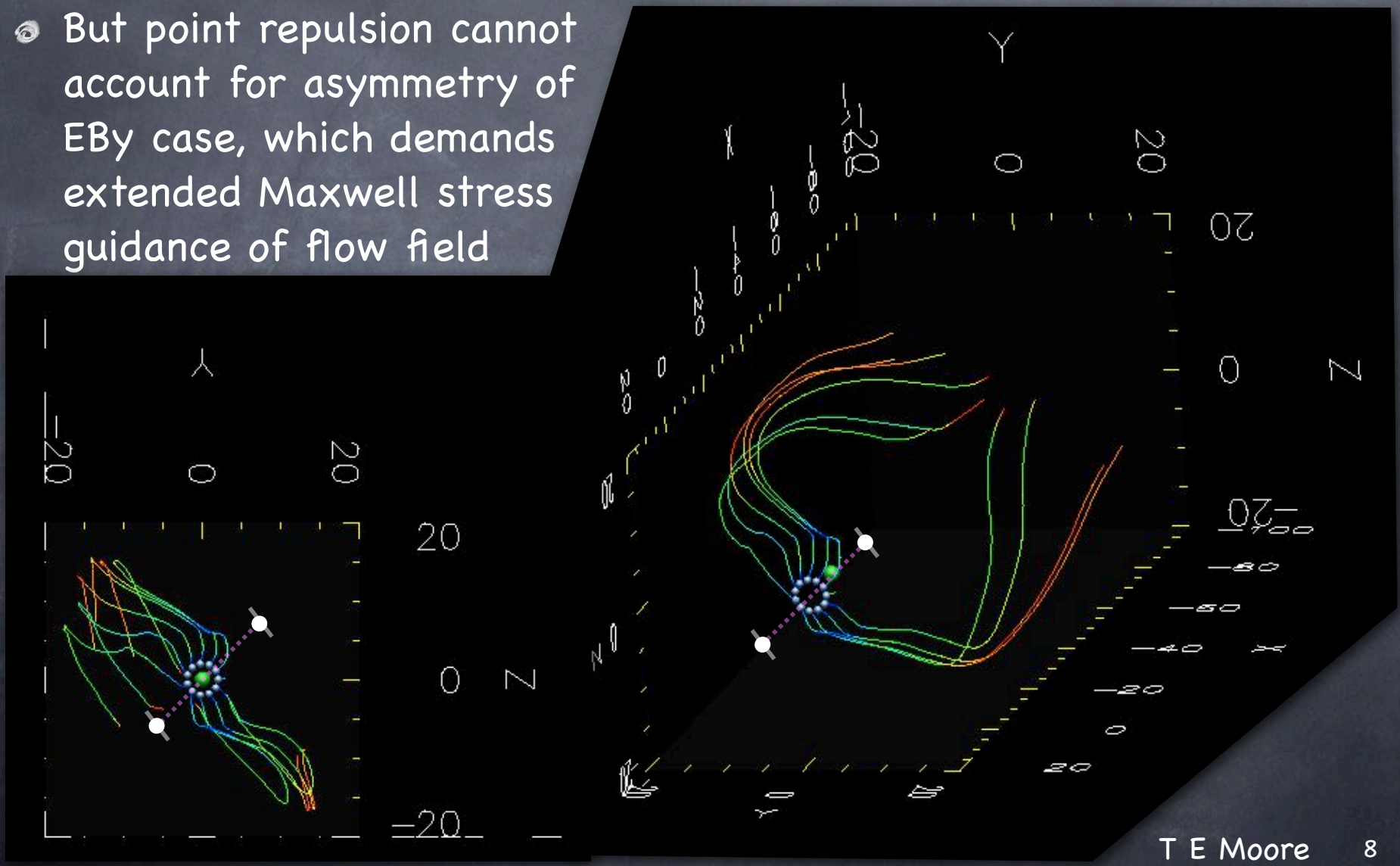
NBz - Bz = 5nT; By = 0

- Repulsion from local nulls where field is antiparallel could work for NBz



EBy - Bz = 0, By = 10nT

- But point repulsion cannot account for asymmetry of EBy case, which demands extended Maxwell stress guidance of flow field



SBz - Bz = -5nT, By = 0

- Nulls merge and only an extended X line can produce the cleavage away from the LLBLs for SBz