

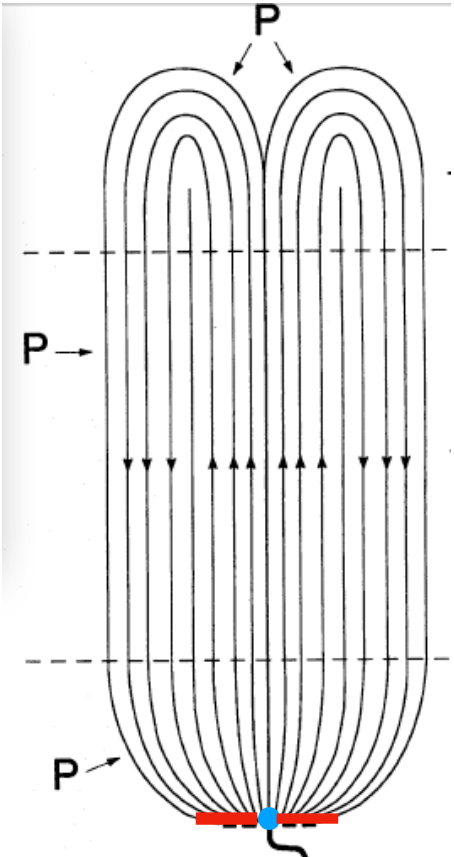
# Magnetic Tower

- low density magnetically dominated
- “cavity” grows with time
- toroidal magnetic pressure pushes flow ahead of the rising tower
- Field || to flow on axis, changing to toroidal field at edge.
- in principle, could remain magnetically dominated out to observable scales, so flow is still slaved to magnetic field there
- field primarily toroidal at large r

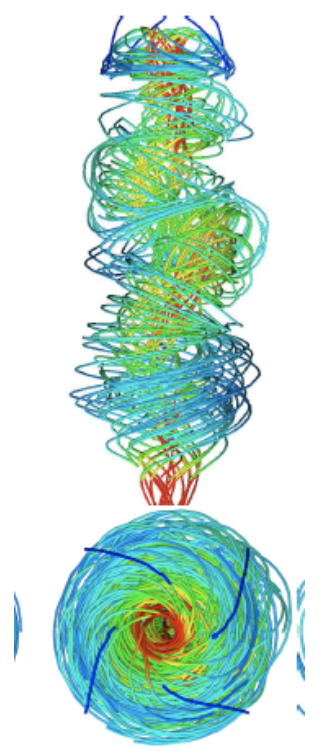
# Magneto-centrifugal Launch

- magnetically dominated at base (and thus resembles magnetic tower there) base but becomes flow dominated at observable scales
- flow is centrifugally launched onto field lines from disk, then pressure from toroidal magnetic pressure accelerates flow
- field at large scales is slaved to flow on observed scales: e.g. if jet has nonuniform outflow speed, field can be stretched along jet direction, so field could be less dominantly toroidal than for magnetic tower

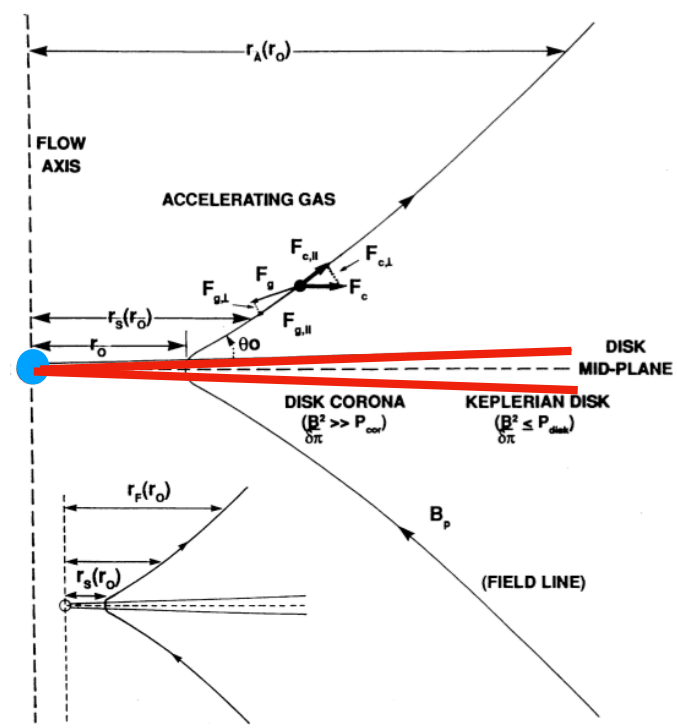
e.g. Lynden-Bell 96,03



Magnetic field strength [ $\mu\text{G}$ ]  
 15.00 25.00 35.00 45.00 55.0



Huarte-Espinosa et al. 2012



Blandford Payne (82); Pellitier & Pudritz (92)