Physics 239

Lect 1-7  Re-cap

- Basic Ideas, Scales
- Viscous Flow in Cylindrical Geometry
  - Viscous Stress

- Viscous Stress Model of Accretion
  - Disk Structure
  - Velocity + Time Scales
  - Density $\Sigma$, Angular Momentum Transport (with $\dot{M}$), inner exerts torque on outer
  - $M, r, \Sigma$ relations
  - Viscous Heating + Luminosity

- Dynamics of Accretion
  - Relaxation, Fixed mass $\rightarrow$ solid body rotation
  - Accretion
  - Minimum energy $\mathcal{O} + \frac{1}{2}$
  - Accreted state + 1 particle at $\infty$ (carries any mom).

- Rayleigh - 2 particles, interchange conserving angular momentum, each.
  - Ideal buoyancy, Rayleigh Discriminant
- Lynden-Bell 2 particles $\rightarrow$ conservation sum of LE mass
  $\Delta E < 0 \rightarrow$ emission + angular-momentum transport outward.

Electrically coupled particles $\rightarrow$ MRI.

$\rightarrow$ Crash Course in MHD

- Eqs. $\rightarrow$ Flow + Induction, $\nabla \times D = 0$
  - Freezey-in, ALFven Thm.,
  - Stresses, Energy
  - Waves - especially ALFven (6 hour)

* Magnetic Breaking, Torsional ALFven.
  - Virial Thm. $\rightarrow$ lumped inertia term.
  - PI MHD + Ambeckler difference $\rightarrow$ neutrals plasma.