

# Non-ideal MHD

$$\frac{\partial \mathbf{B}}{\partial t} = \nabla \times (\mathbf{v} \times \mathbf{B}) + \eta \nabla^2 \mathbf{B}$$

Resistivity

$$\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho \mathbf{v}) = 0$$

Coriolis                      Gravity                      "Other"

$$\rho \frac{\partial \mathbf{v}}{\partial t} + \rho (\mathbf{v} \cdot \nabla) \mathbf{v} + 2\rho \boldsymbol{\Omega} \times \mathbf{v} = -\nabla p + \mathbf{j} \times \mathbf{B} + \rho \mathbf{g} + \mathbf{F}$$

$$p = \frac{1}{\tilde{\mu}} \rho \mathcal{R} T$$

$$\frac{\rho^\gamma}{\gamma - 1} \frac{D}{Dt} \left( \frac{p}{\rho^\gamma} \right) = \nabla \cdot (\kappa \nabla T) - \rho^2 Q(T) + \frac{\mathbf{j} \cdot \mathbf{j}}{c} + H$$

Thermal Conduction                      Radiation                      Ohmic heating                      "Other"