

Pressure scale height worksheet

EJZ
7 Aug 04

Total pressure gradient $\nabla P = \frac{d}{dz} (P_0 + \frac{B_0^2}{8\pi})$

for gas pressure P_0 and magnetic field B varying with height z (e.g. above the photosphere).

If magnetic field is uniform with height,
Simplify $\nabla P =$ _____

HSE Hydrostatic equilibrium: $\nabla P = -\rho_0 g$ where
 $\rho_0 =$ mass density of gas/plasma. If $P_0 = \rho_0 R T$
(ideal gas), then write HSE in terms of ρ_0 :

Separate variables: $\frac{d\rho_0}{\rho_0} =$ _____ dz and solve
for $\rho_0 = \rho_{00} e^{-z/H}$

Pressure scale height $H =$ _____

cf T3 in first half of this notebook: Thomas 1983 p. 324-5 (ul)