

$$\rho = N \left(H^2 + \frac{Rc^2}{R^2} \right)$$

$$\rho = 1.0001 \times 10^{-9} \text{ J/m}^3, N = 1.6077 \text{ kgm}^{-1}, R = 1$$

$$\rho = N \left(H^2 + \frac{Rc^2}{R^2} \right)$$

$$\frac{\rho}{N} = H^2 + \frac{Rc^2}{R^2}$$

$$\frac{Rc^2}{R^2} = \frac{\rho}{N} - H^2 = \frac{\rho - H^2 N}{N}$$

$$\frac{R^2}{Rc^2} = \frac{N}{\rho - H^2 N}$$

$$R^2 = Rc^2 \left(\frac{N}{\rho - H^2 N} \right) \Rightarrow R = \sqrt{Rc^2 \left(\frac{N}{\rho - H^2 N} \right)}$$

$$R_0 = \sqrt{Rc^2 \left(\frac{N}{\rho_0 - H^2 N} \right)}$$

$$= \sqrt{1 \times (3 \times 10^8 \text{ ms}^{-1})^2 \times \left(\frac{1.6077 \times 10^{26} \text{ kgm}^{-1}}{(1.0001 \times 10^{-9} \text{ Jm}^{-3}) - (2 \times 10^{-18} \text{ s}^{-1})^2 \times 1.6077 \times 10^{26} \text{ kgm}^{-1}} \right)}$$

$$= \sqrt{9 \times 10^{16} \text{ m}^2 \text{ s}^{-2} \times 4.50311 \text{ m}^2 \text{ s}^2}$$

$$= 2.0256 \times 10^{26} \text{ m} \checkmark$$

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