Magnetic fields in Astrophysics

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ERRATA (TEN YEARS LATER)

• Equation (3.15) has incorrect sign, should read

$$\nabla A = \frac{1}{\rho} [\nabla (\rho A) - A \nabla \rho]$$

(3.15)

• Equation (3.23) has incorrect sign, should read

$$(\nabla \times \mathbf{v})_a \approx \frac{1}{\rho_a} \sum_b m_b (\mathbf{v}_a - \mathbf{v}_b) \times \nabla a W_{ab}.$$  

(3.23)

• Equation (3.49) has incorrect sign, should read

$$\frac{\partial L}{\partial r_a} = - \sum_b m_b \frac{\partial u_b}{\partial \rho_b} \mid \frac{\partial \rho_b}{\partial r_a}.$$  

(3.49)

• Equation (3.52)-(3.53) have incorrect signs, should read

$$\frac{\partial L}{\partial r_a} = - \sum_b m_b \sum_c m_c \nabla a W_{bc} (\delta_{ba} - \delta_{ca})$$

(3.52)

$$= - m_a \sum_b m_b \left( \frac{P_a}{\rho_a^2} + \frac{P_b}{\rho_b^2} \right) \nabla a W_{ab},$$  

(3.53)

• Equation (3.56) and the preceding line have incorrect signs, should read

$$\frac{d}{dt} \sum_a r_a \times m_a \mathbf{v}_a = \sum_a m_a \left( r_a \times \frac{d \mathbf{v}_a}{dt} \right),$$

(3.55)

$$= - \sum_a \sum_b m_a m_b \left( \frac{P_a}{\rho_a^2} + \frac{P_b}{\rho_b^2} \right) r_a \times (r_a - r_b) F_{ab},$$

(3.56)

• Equation (3.62) has incorrect sign, should read

$$\frac{dE}{dt} = \sum_a m_a \frac{de_a}{dt} = - \sum_a \sum_b m_a m_b \left( \frac{P_a}{\rho_a^2} \mathbf{v}_b + \frac{P_b}{\rho_b^2} \mathbf{v}_a \right) \cdot \nabla a W_{ab},$$

(3.62)

• Equation (3.63) has incorrect sign, should read

$$\frac{de_a}{dt} = - \sum_b m_b \left( \frac{P_a}{\rho_a^2} \mathbf{v}_b + \frac{P_b}{\rho_b^2} \mathbf{v}_a \right) \cdot \nabla a W_{ab}.$$  

(3.63)

What’s a few minus signs between friends? I hope nobody has died as a result.
Let me know if you have spotted any others.

DJP, Feb 2014