

4-9-14 98

Test 3

Quick Review: CH 25/26, 27

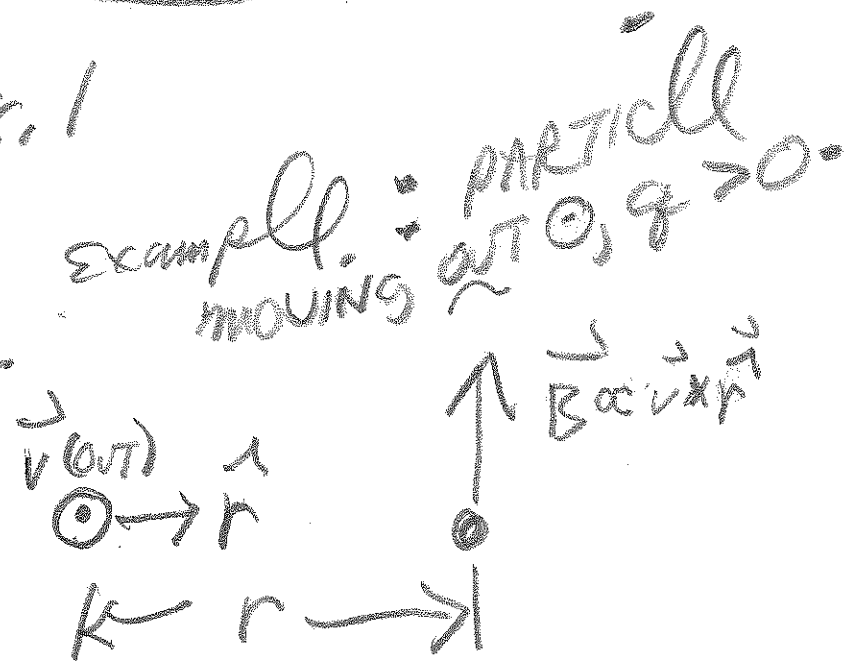
check sample test 4AKS (nvaphysics.com)

MAIN theme: moving CHARGE(s) cause B-Fields
CH 28 sec 28.1

$$\vec{B} = \frac{\mu_0}{4\pi} \frac{q \vec{v} \times \vec{r}}{r^2}$$

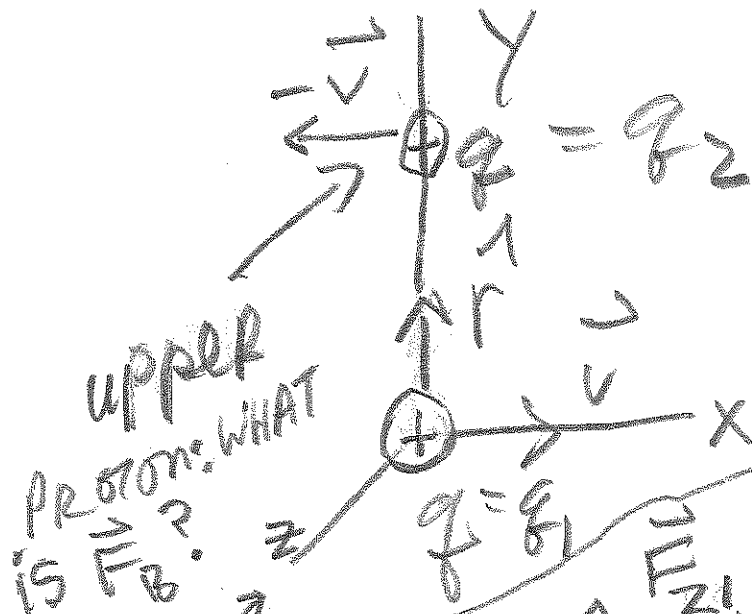
fig 28.1

simple

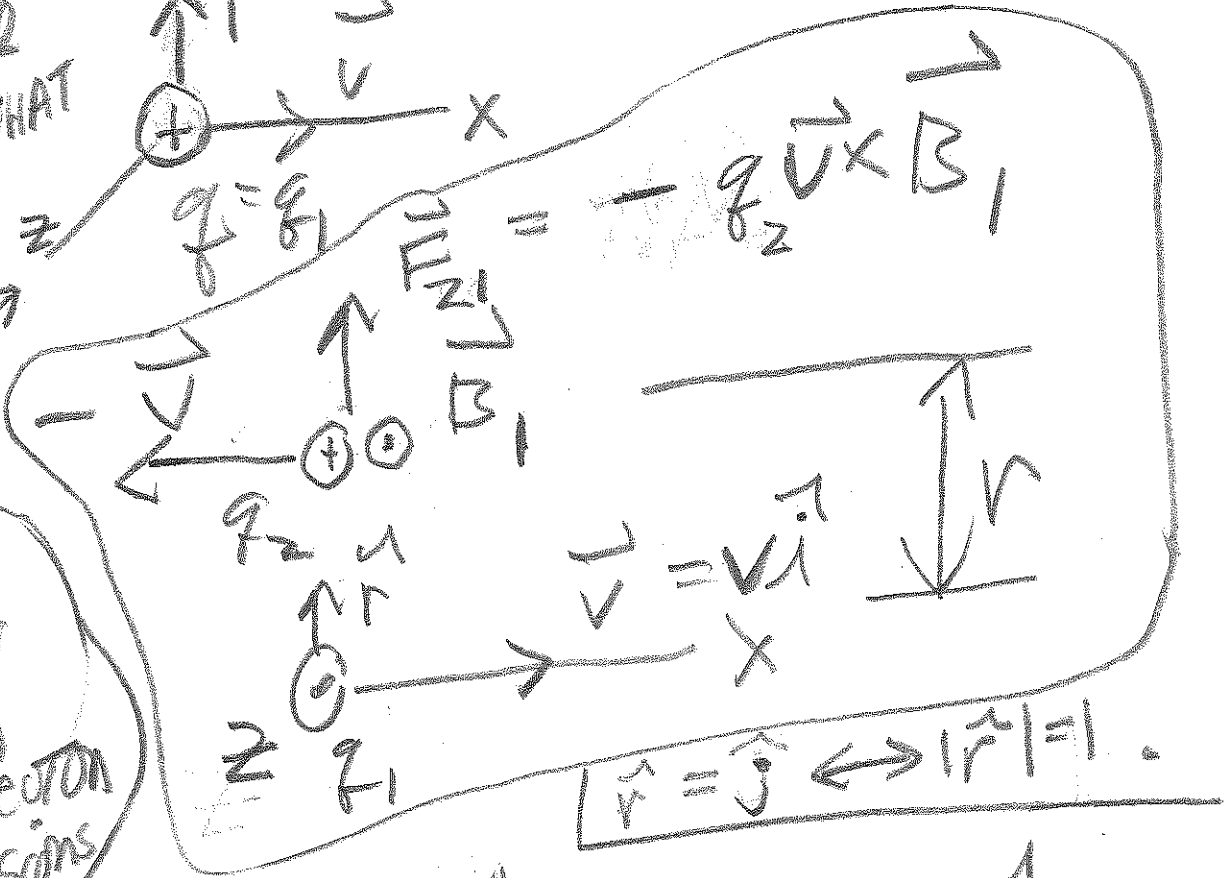


Example 1 =

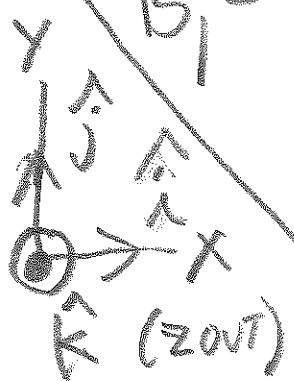
see PAST
 RESULT ON Z || \rightarrow
 WIRES $\leftarrow \uparrow F_{||}$
 (repel) $\rightarrow \downarrow F_{||}$



APPLICATION:
 HIGGS
 - BOSON
 RELATED
 PROTON
 - PROTON
 COLLISIONS



$$\vec{B}_1 = \frac{\mu_0}{4\pi} \frac{q_1 (v \hat{i}) \times \hat{j}}{r^2} = \frac{\mu_0 q_1 v}{4\pi r^2} \hat{k} \text{ (out)}$$



on q_2 from q_1

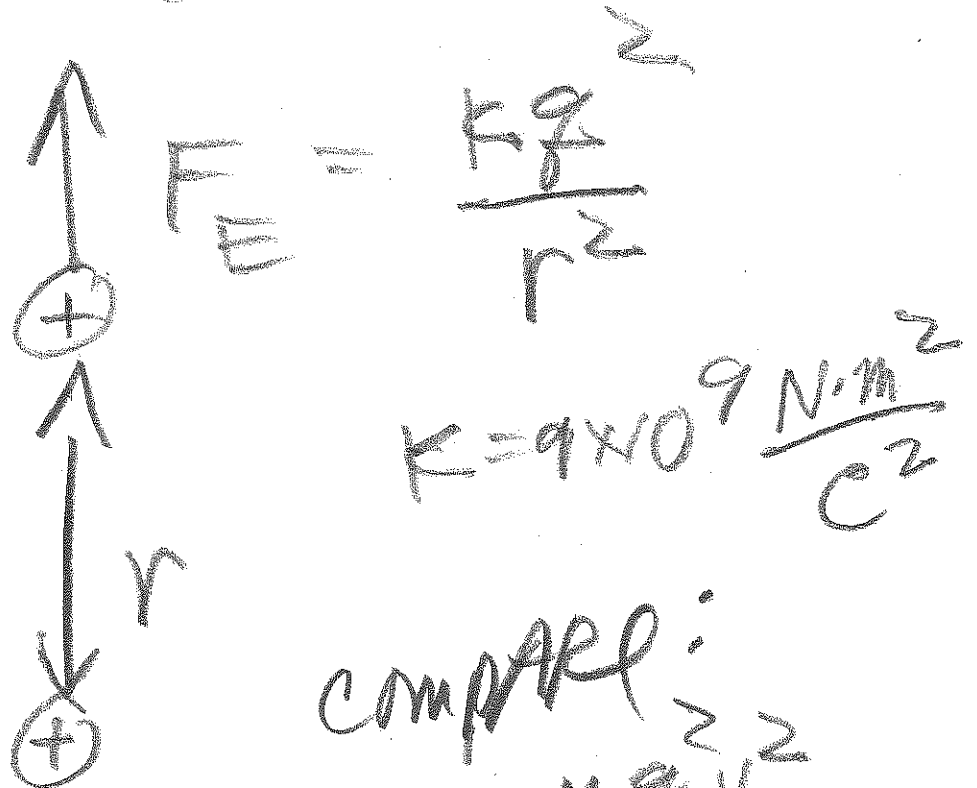
$$\vec{F}_{z1} = q_2 (-\vec{v} \times \vec{B}_1)$$

$$= q_2 (-v \hat{i}) \times \frac{\mu_0 q_1 v}{4\pi r^2} \hat{k} = \frac{\mu_0 q_1 q_2 v^2}{4\pi r^2} \hat{j}$$

QUESTION :

compare $|\vec{F}_B| = |\vec{F}_E|$

and $|\vec{F}_E|$



$$F_E = \frac{kq^2}{r^2}$$

$$k = 9 \times 10^9 \frac{\text{N} \cdot \text{m}^2}{\text{C}^2}$$

compare:

$$F_B = \frac{10^8 v^2}{r^2}$$

$$\text{Let } v \approx 3 \times 10^8 \frac{\text{m}}{\text{s}}$$

$$\frac{F_E}{F_B} =$$

$$\frac{kq^2}{r^2} \div \frac{\mu_0 q^2 (3 \times 10^8)^2}{4\pi r^2}$$

$$= \frac{F_E}{F_B} = \frac{4\pi k}{\mu_0 (3 \times 10^8)^2}$$

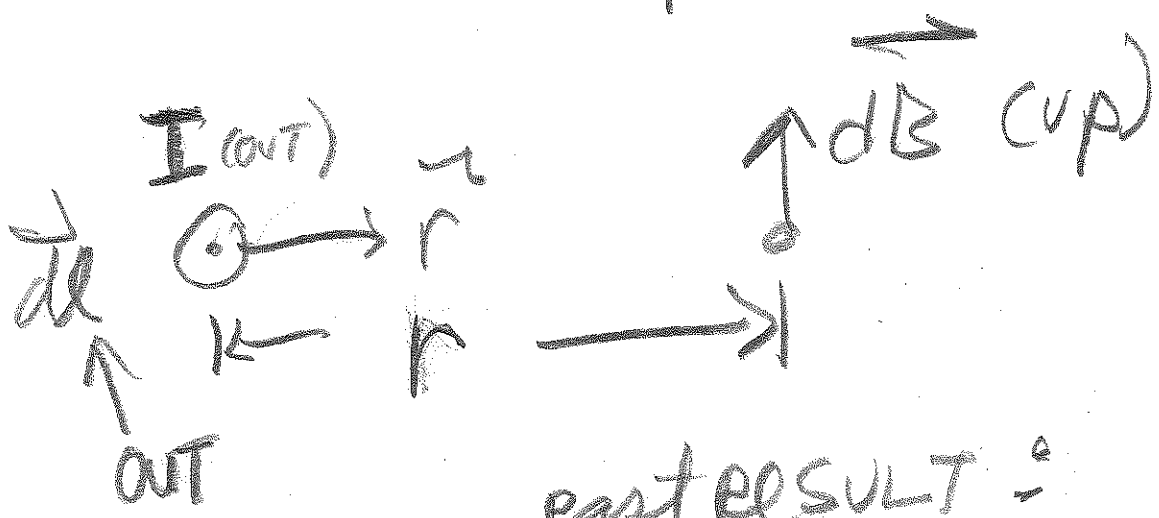
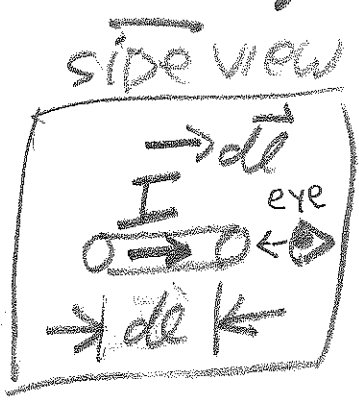
$$= \frac{9 \times 10^9 \cdot 4\pi}{(4\pi \times 10^{-7}) (3 \times 10^8)^2}$$

$$= \frac{9 \times 10^9 \cdot 4\pi}{8\pi \times 10^{-14} \cdot 9 \times 10^{16}}$$

$$\frac{F_E}{F_B} = 1$$

current element sec 28.2

$$d\vec{B} = \frac{\mu_0 I d\vec{l} \times \vec{r}}{4\pi r^2}$$



part RESULT :

