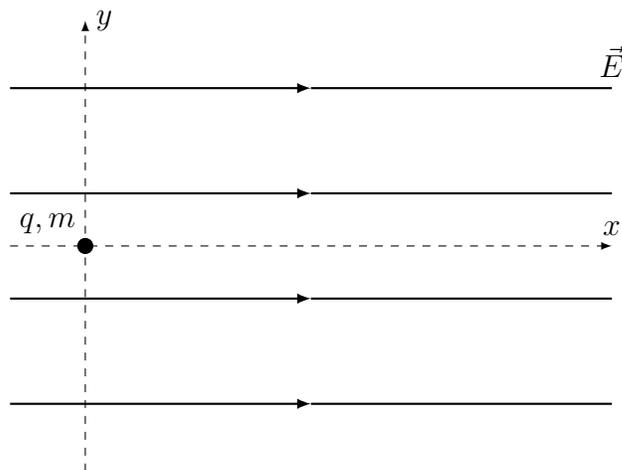


Interactive Problem Set 5, SP212 Spring 2013

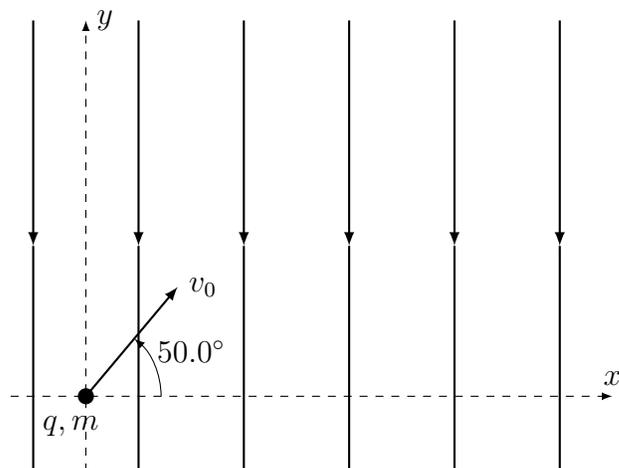
Topic: 22.8 - 22.9 Charges and Dipoles in an Electric Field

IPS 5.1 (in-class) A helium nucleus ($q = +2e$, $m = 6.645 \times 10^{-27}$ kg) is released in a uniform electric field of strength 3.00×10^6 N/C. What is the speed of the nucleus after it moves through 1.00 cm?



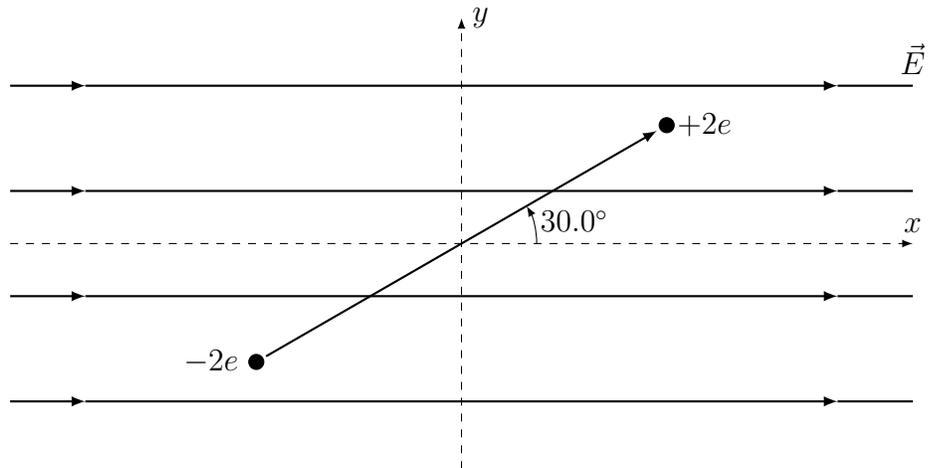
IPS 5.2 (in-class) Suppose the helium nucleus is instead injected with a speed $v_0 = 2.00 \times 10^6$ m/s at an angle of 50.0° above the horizontal with the uniform \vec{E} field directed down ($E = 3.00 \times 10^6$ N/C).

- What is the position \vec{r} of the nucleus at the top of its trajectory?
- What is the velocity \vec{v} of the nucleus at the top of its trajectory?



IPS 5.3 (in-class) An electric dipole consisting of charges $+2e$ and $-2e$ separated by 0.700 nm is placed in a uniform electric field of strength $3.00 \times 10^6\text{ N/C}$. The E field points in the $+x$ direction; the dipole moment \vec{p} is inclined at 30.0° above the $+x$ axis.

- What is the potential energy of this dipole?
- What is the torque on this dipole?



IPS 5.4 (homework) We will have a 15 minute quiz on Friday drawing from IPS 1 - 3. Finish and review IPS 1 -3. As you review, doctor up your solutions anywhere you find yourself expending extra effort to reconstruct what you did. *Once you are done reviewing, document a few points that will help you make reliable calculations on the quiz.*

Reading for next class: Read WPC Ch23. In the textbook, review Ch22 for anything you can find in the way of text and figures that has to do with electric field *lines*, our main tool for visualizing electric fields.