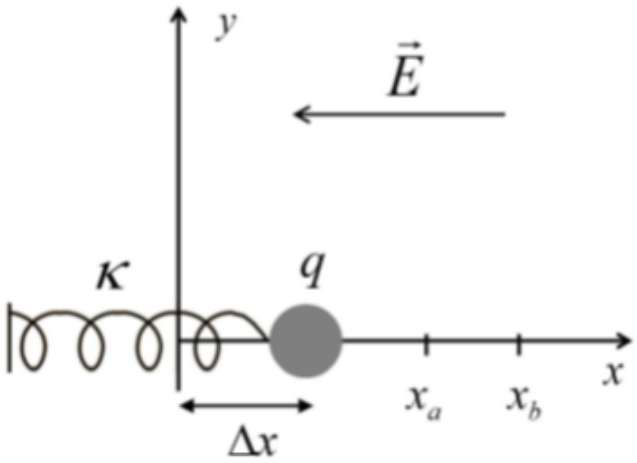
Fundamentals of Physics (2020-2021)
Task 8: Electrostatics

- This exercise reviews the basics of electrostatics. Read the statement calmly and you will see that it is simpler than it seems.
- You will need some basic knowledge on topics of the beginning of the course. The goal is for you to be able to relate concepts from different topics.



A proton (charge $q = e$) is attached to a spring with elastic constant k. There is in an homogeneous horizontal electric field $\vec{E} = -E\hat{i}$, as can be seen in the picture. Δx is the elongation of the proton-spring system. Determine if the following sentences are **true** or **false** and **justify your answer**.

1. The potential created by the uniform electrical field $\vec{E}$ is larger at the position x_a than in the position x_b.
2. The work exerted *by the electrical field* $\vec{E}$ to move the proton from x_a to x_b is $W_e = -eE(x_b - x_a)$.
3. If $x_b = 2x_a$, the magnitude of the electric potential generated by the proton at x_b, V_b, is twice the magnitude of the electric potential generated by the proton at x_a, V_a. In other words, $V_b = 2V_a$.
4. At equilibrium, the spring elongation will be $\Delta x = -\frac{eE}{k}$ (where k is the elastic constant of the spring).
