



INSTITUTO DE FÍSICA

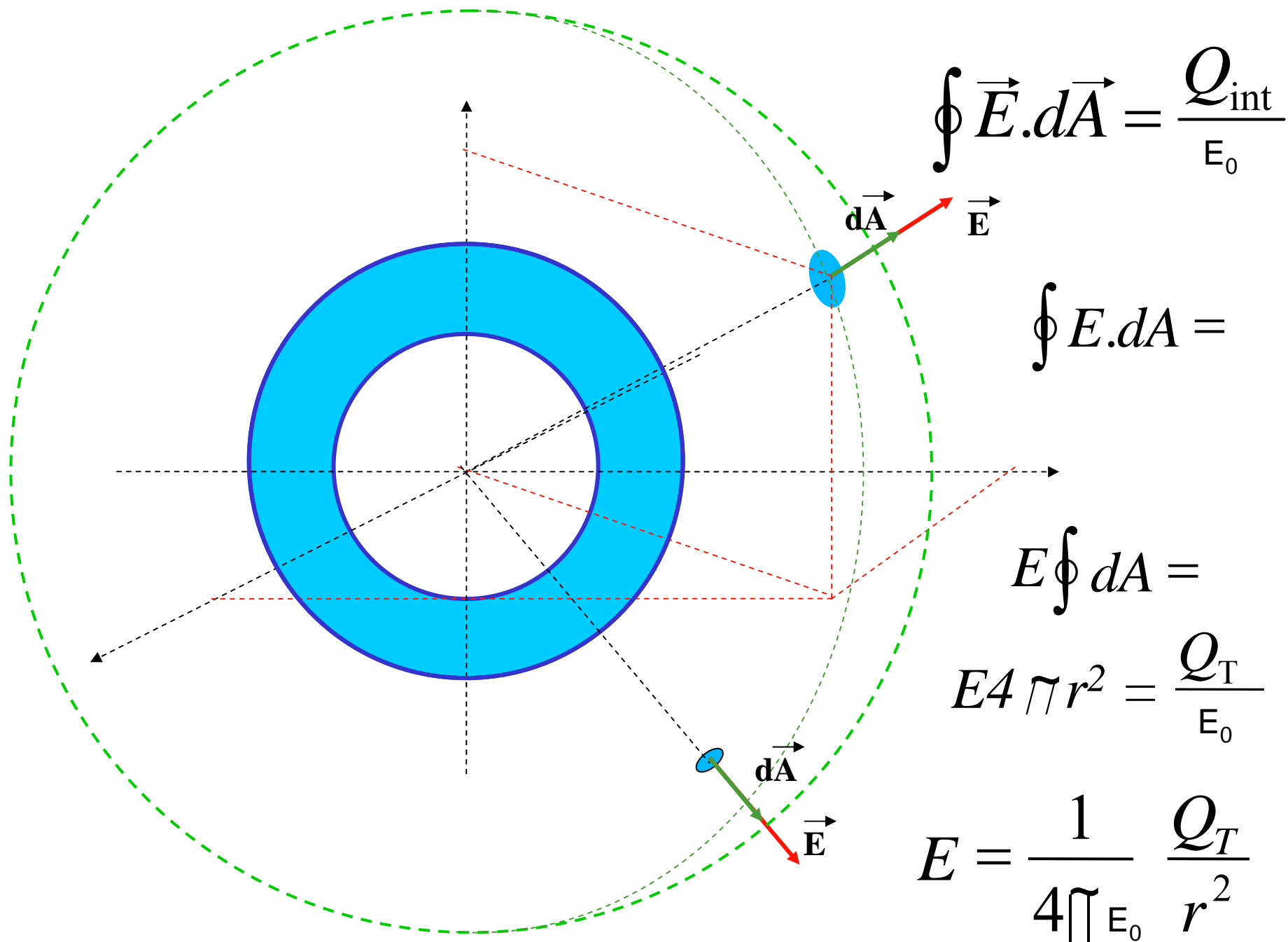
uff Universidade Federal Fluminense

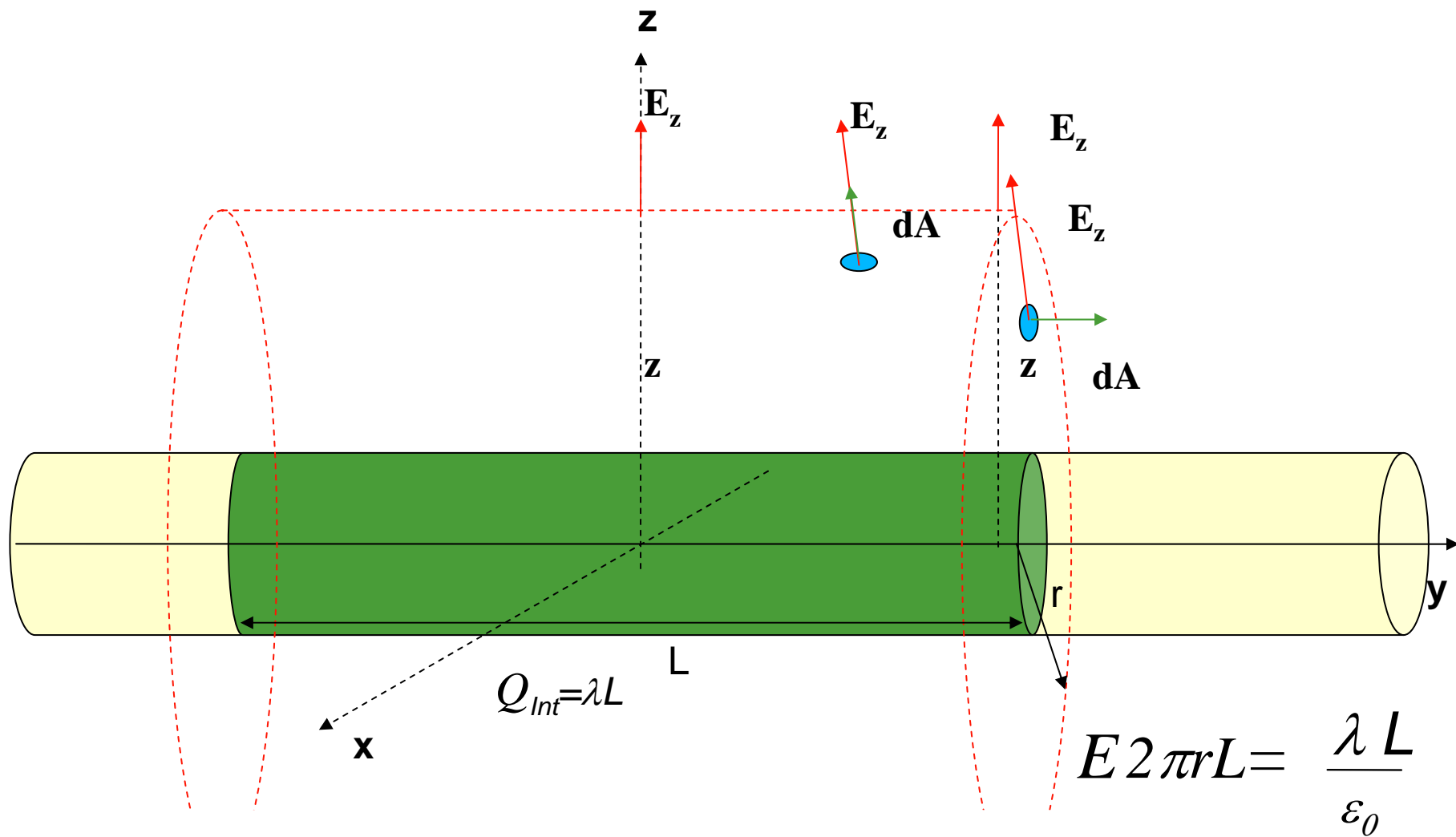
Física XX

Eletrostática

Aula anterior

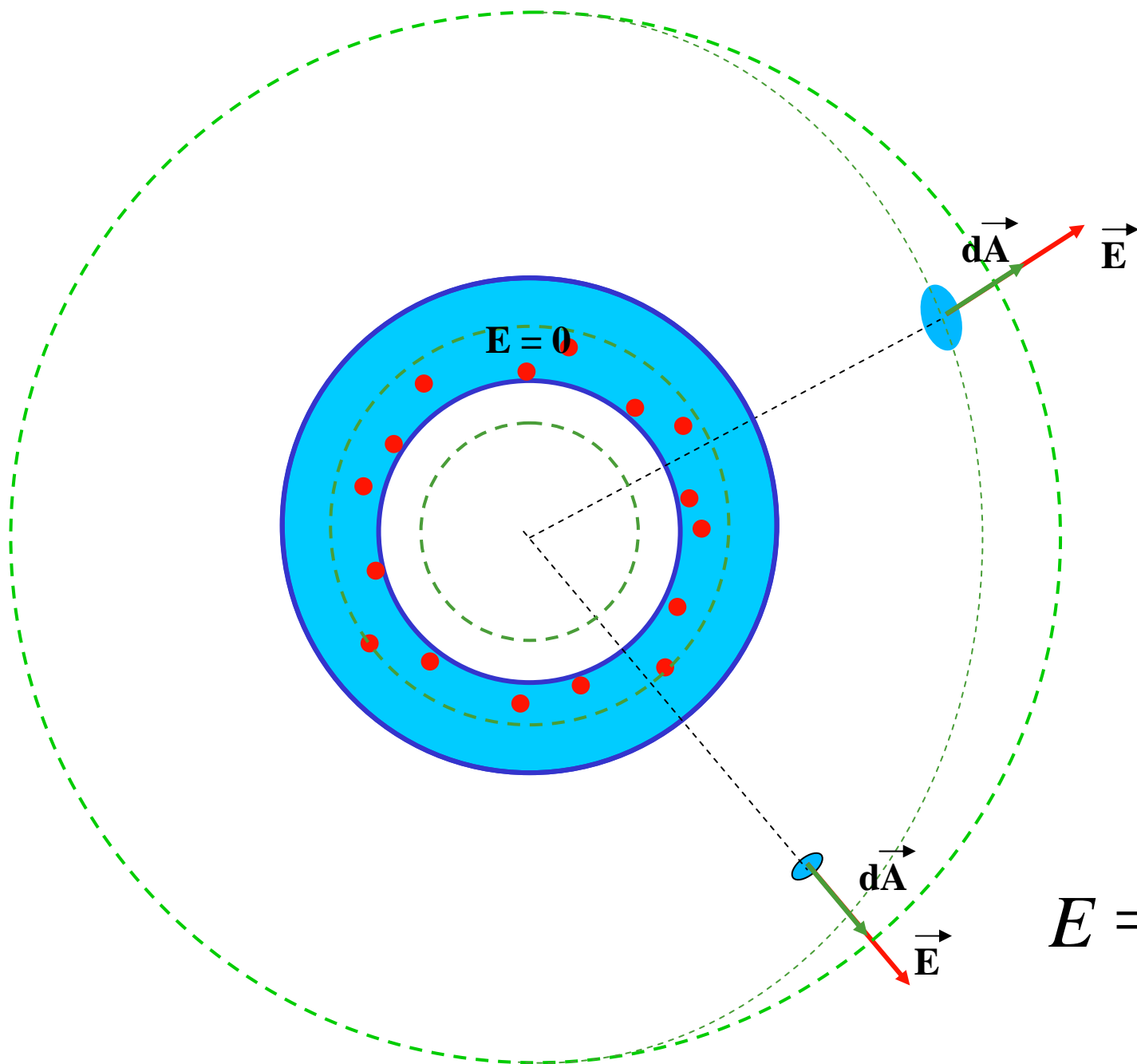
- Lei de Gauss.
- Campo externo e interno de uma esfera.
- Campo de um fio infinito.
- Campo de um plano infinito.



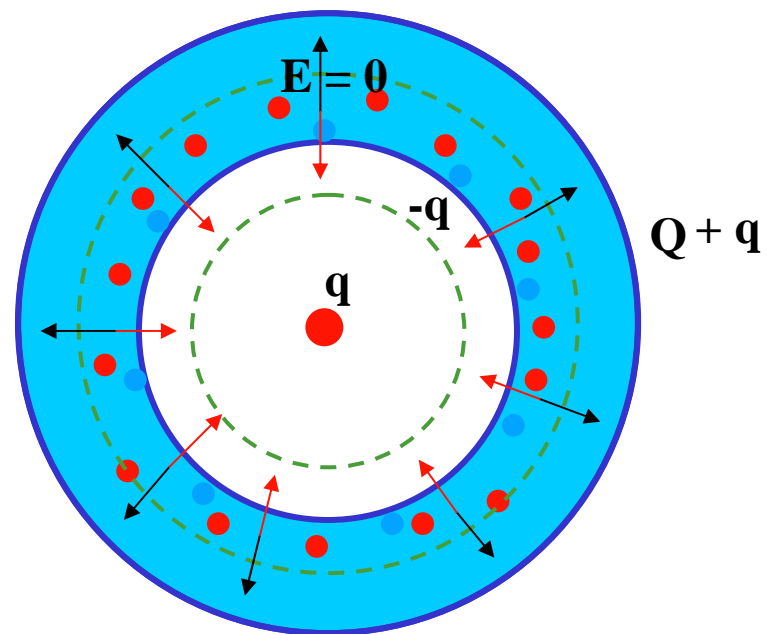


$$\int_{LAT} E \cdot dA = E \int_{LAT} dA = E 2 \pi r L = \frac{Q_{Int}}{\epsilon_0}$$

$$E = \frac{1}{2 \pi \epsilon_0} \frac{\lambda}{r}$$



$$E = \frac{1}{4\pi\epsilon_0} \frac{Q_T}{r^2}$$

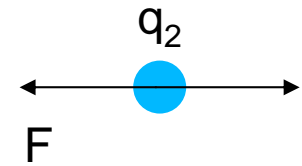
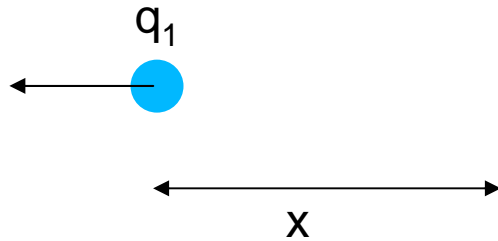


$$dW = F dr$$

$$dW_E = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2} dr$$

$$\int dW_E = \frac{1}{4\pi\epsilon_0} q_1 q_2 \int \frac{dr}{r^2}$$

$$\int dW_E = \frac{1}{4\pi\epsilon_0} q_1 q_2 \int_{\infty}^x \frac{dr}{r^2} = \frac{1}{4\pi\epsilon_0} q_1 q_2 \left[-\frac{1}{r} \right]_{\infty}^x = -\frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{x}$$



$$W_F = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{x} = U_F - U_I \quad U_{\infty} = 0$$

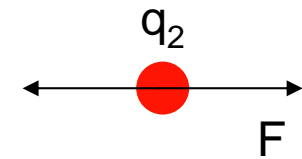
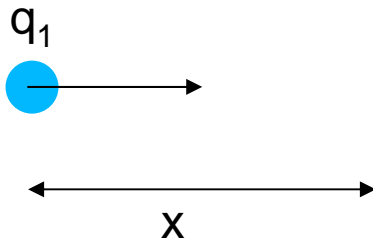
$$U = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{x}$$

$$dW = F dr$$

$$dW_E = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2} dr$$

$$\int dW_E = \frac{1}{4\pi\epsilon_0} q_1 q_2 \int \frac{dr}{r^2}$$

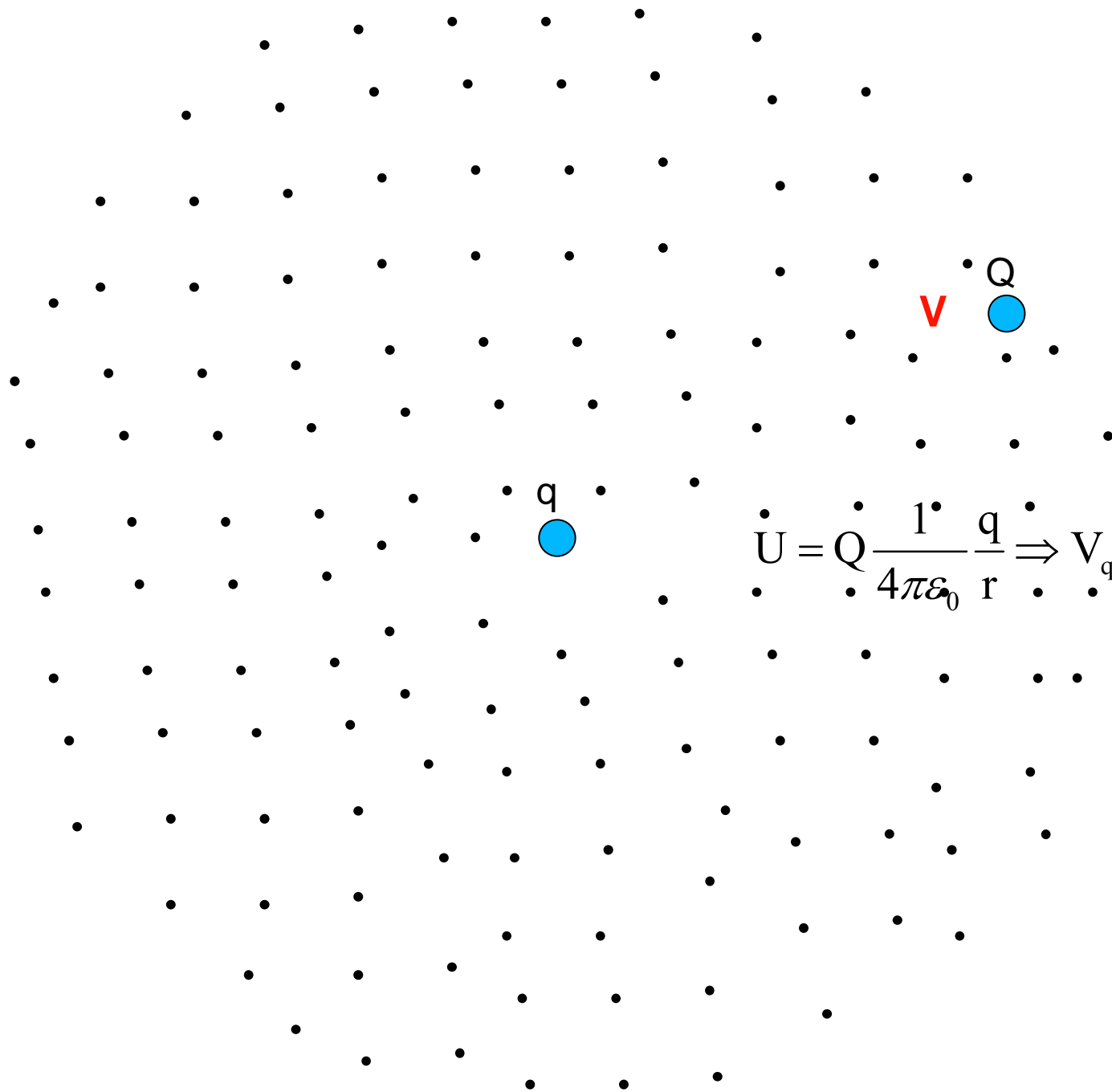
$$\int dW_E = \frac{1}{4\pi\epsilon_0} q_1 q_2 \int_{\infty}^x \frac{dr}{r^2} = \frac{1}{4\pi\epsilon_0} q_1 q_2 \left[-\frac{1}{r} \right]_{\infty}^x = -\frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{x} = +\frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{x}$$



$$W_F = -\frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{x} = U_F - U_I$$

$$U_{\infty} = 0$$

$$U = -\frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{x}$$



$$U = QV_q$$

$$U = \frac{1}{4\pi\epsilon_0} \frac{qQ}{r}$$

$$U = Q \frac{1}{4\pi\epsilon_0} \frac{q}{r} \Rightarrow V_q = \frac{1}{4\pi\epsilon_0} \frac{q}{r}$$