Consider drift of Na^+ and Cl^- ions in a plastic pipe filled with salt water.

- $v_{1x} > 0$, $v_{2x} < 0$: drift velocities; $q_1 > 0$, $q_2 < 0$: charge on ions
- n_1, n_2: number of charge carriers per unit volume
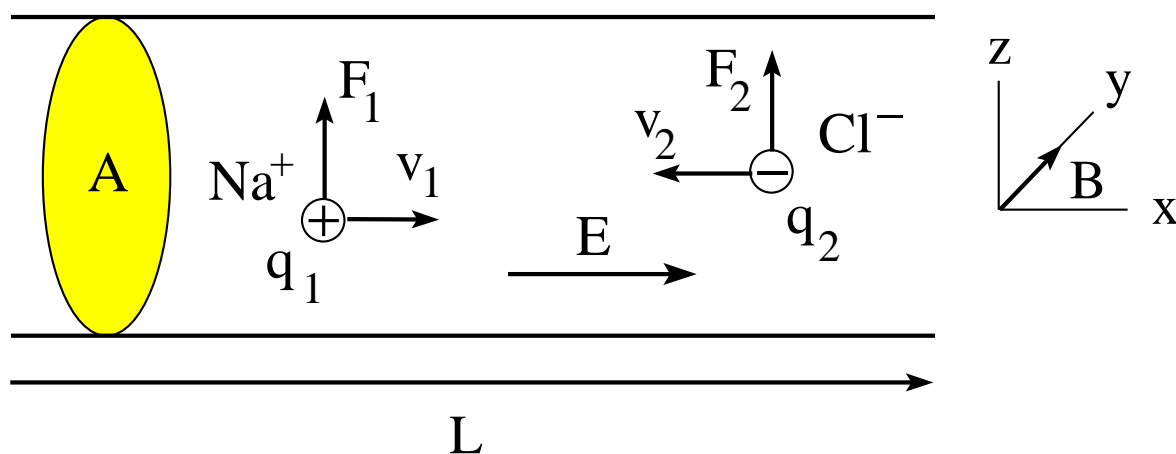
- Electric current through A: $I = A(n_1 q_1 v_{1x} + n_2 q_2 v_{2x})$
- Force on Na^+: $\vec{F}_1 = q_1 \vec{v}_1 \times \vec{B} \Rightarrow F_{1z} = q_1 v_{1x} B_y$
- Force on Cl^-: $\vec{F}_2 = q_2 \vec{v}_2 \times \vec{B} \Rightarrow F_{2z} = q_2 v_{2x} B_y$
- Force on current-carrying pipe: $F_z = (n_1 q_1 v_{1x} + n_2 q_2 v_{2x}) A L B_y = I L B_y$
- Vector relation: $\vec{F} = I \vec{L} \times \vec{B}$