

2. An alpha particle with kinetic energy 0.27 MeV is deflected through an angle of  $60^\circ$  by a golden foil. Find the corresponding value of the aiming parameter.

Solution:

We know that

$$\tan \theta/2 = \left( \frac{q_1 q_2}{4 \pi \epsilon_0} \right) / 2 b T$$

$$\text{Thus, } b = \left( \frac{q_1 q_2}{4 \pi \epsilon_0} \right) \frac{\cot \theta/2}{2 T}$$

For  $\alpha$  particle  $q_1 = 2e$ , for gold  $q_2 = 79e$

In Gaussian units there is no factor  $\left( \frac{1}{4 \pi \epsilon_0} \right)$ .

On substituting we get 0.731pm