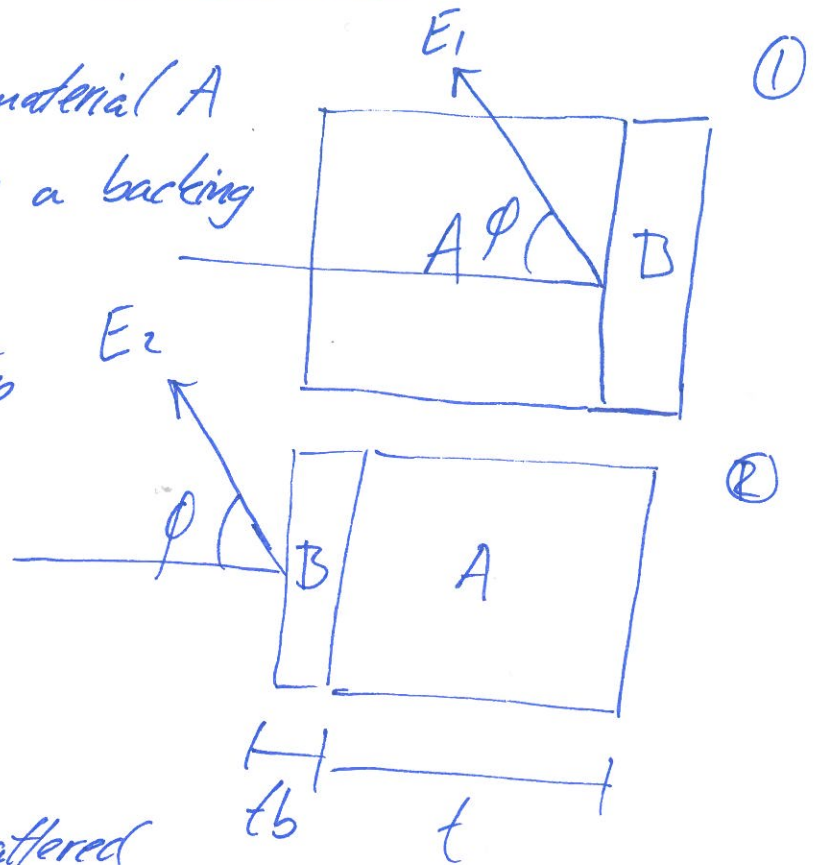# Target thickness two layer

Assume a target of material A with a thickness t on a backing with thickness t_b.

A beam of energy E_b is then scattered on the target with the backing either facing away ① or towards ② the beam.

The energy of the scattered beam is

$$E_2 = K_b(\theta) E_b$$

$$E_1 = K_B(\theta)\left(E_b - S_A(E_b) t\right) - S\left(K_B(\theta)\right)^{E_b} \frac{t}{\cos\phi}$$

where K_B is the kinematic factor for scattering of the backing, and S_A is the stopping power $\frac{dE}{dx}$ in the target material.

$$\Delta E = E_2 - E_1$$

$$= K_B S_A(E_b) t + S\left(K_B(\theta)\right)^{E_b} \frac{t}{\cos\phi}$$

$$\Rightarrow t = \frac{\Delta E}{K_B(\theta) S_A(E_b) + S\left(K(\theta)E_b\right)/\cos\phi}$$