

2011 Day 2 Q1A (general)

a. flux = density · avg velocity at wall ( $x=0$ )

~~$n(x=\text{wall}) =$~~

$$n(x=0) = \int f(x=0, v) dv$$

$$v_{\text{avg}} = \frac{\int f v dv}{\int f dv}$$

$$\rightarrow \text{flux} = n v_{\text{avg}} = \int f(x=0, v) v dv$$

b.  $E_{\text{out}} = \beta E_{\text{in}}$  (if reflected)

$$\rightarrow v_{\text{out}} = \sqrt{\beta} v_{\text{in}}$$

If all were reflected this way,  $f(v) = f(-\sqrt{\beta} v)$   $v < 0$  (into the wall)

But only  $\alpha$  are reflected, so  $f(v) = \frac{1}{\alpha} f(\frac{1}{\sqrt{\beta}} v)$

this is the reflection B.C. at the wall.