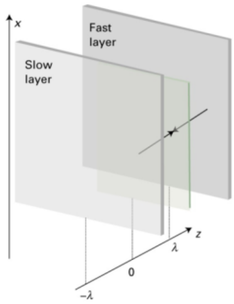
Laminar flow



- MQs travelling from a fast layer to a slow layer transport a momentum of $mv_x(\lambda)$ to their new layer at z=0; those travelling the other way transport $mv_x(-\lambda)$.
- Assuming a uniform density, $Z_W = \frac{1}{4}\mathcal{N}v_{mean}$.
- Momentum of MQs arriving from the right: $mv_x(\lambda) = mv_x(0) + m\lambda\left(\frac{dv_x}{dz}\right)_0$, and from the left: $mv_x(-\lambda) = mv_x(0) - m\lambda\left(\frac{dv_x}{dz}\right)_0$.
- The net flux of *x*-momentum is $J_z = \frac{1}{4}v_{mean}\mathcal{N}\left\{\left[mv_x(0) - \lambda\left(\frac{dv_x}{dz}\right)_0\right] - \left[mv_x(0) + \lambda\left(\frac{dv_x}{dz}\right)_0\right]\right\} = -\frac{1}{2}v_{mean}\lambda m\mathcal{N}\left(\frac{dv_x}{dz}\right)_0$, *i.e. J* α velocity gradient.