$$\sigma_{Y_{ER}} = \frac{(1 + V/3)}{E_R} \sqrt{\underbrace{(\sigma_I^0)^2 + (a_I E_{ee})^2}_{\sigma_I^2} + \underbrace{(\sigma_H^0)^2 + (a_H E_{ee})^2}_{\sigma_H^2}}$$

note that E_I, E_H signals are normalized so that

$$E_I = E_H = E_R \text{ for } \gamma\text{-interactions}$$

~~so~~ I <u>think</u> we can replace E_{ee} w/ E_R in $\sigma_{Y_{ER}}$

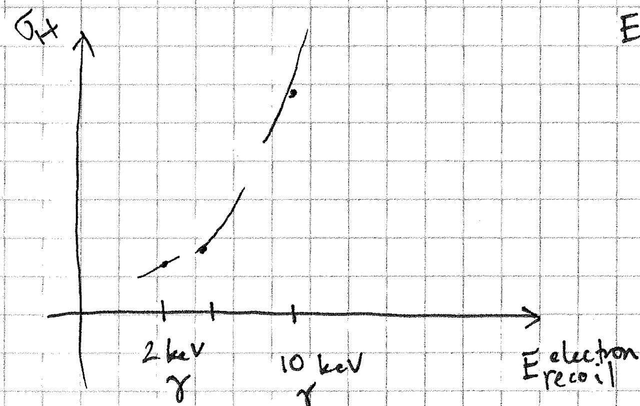
$$\sigma_{Y_{NR}} = ??$$

$$Y = Q = \frac{E_I}{E_R} \quad \text{and} \quad E_{R,n} = \overbrace{\left(1 + \frac{V}{\varepsilon}\right) E_H}^{E_{\text{total phonon}}} - \frac{V}{\varepsilon} E_I \quad \text{for a } \gamma \text{ interaction}$$

and we know σ_{E_I}, σ_{E_H}

for a nuclear recoil, $E_I = Y * E_R$

$E_H =$



$\equiv E_H$

When you have a <u>nuclear</u> recoil depositing an energy, what E_H does it produce??

We know that for an ER, $E_r = \underbrace{\left(1 + \frac{V}{\varepsilon}\right) E_H}_{\text{the CDMS total phonon energy } E_p} - \frac{V}{\varepsilon} E_I$

$E_p = \left(1 + \frac{V}{\varepsilon}\right) E_H$ ← have σ_H as a function of E_H

$$\boxed{E_r + \frac{V}{\varepsilon} Y E_r = \left(1 + \frac{V}{\varepsilon}\right) E_H}$$

so I <u>think</u> $\sigma_H\left(\frac{1 + Y\frac{V}{\varepsilon}}{1 + \frac{V}{\varepsilon}} E_R\right)$ for a given E_R