$$K = 4\pi \int_0^\infty \sigma f w^3 \, dw$$

$$f(w) = \left(\frac{m_e}{2\pi k T_e}\right)^{3/2} \exp\left(-\frac{m_e}{2kT_e} w^2\right)$$

$$E = \frac{1}{2} m_e w^2 \rightarrow w\,dw = \frac{dE}{m_e}$$

$$K = 4\pi \int_0^\infty \sigma \left(\frac{m_e}{2\pi\beta}\right)^{3/2} \exp\left(-\frac{E}{\beta}\right) \frac{w^2}{m_e} \, dE =$$

$$= \frac{8\pi}{m_e^2} \left(\frac{m_e}{2\pi\beta}\right)^{3/2} \int_0^\infty \sigma \exp\left(-E/\beta\right) E \, dE =$$

$\hat{E} = E/\beta$

$$= \sqrt{\frac{8}{m_e \pi}} \left(\frac{1}{\beta}\right)^{3/2} \int_0^\infty \sigma \exp\left(-\hat{E}\right) \hat{E} \beta^2 \, d\hat{E} =$$

$$= \sqrt{\frac{8\beta}{m_e \pi}} \int_0^\infty \sigma \underbrace{\exp\left(-\hat{E}\right) \hat{E} \, d\hat{E}}_{p(\hat{E})} \simeq$$

$$\simeq \sqrt{\frac{8\beta}{m_e \pi}} \sum \sigma(\hat{E}_p)$$

$$P(\hat{E}) = PDF = \exp(-\hat{E})\,\hat{E}$$

$$F(\hat{E}) = CDF = 1 - \exp(-\hat{E})\,(\hat{E}+1)$$

$$U[0,1] = F(\hat{E}_i) \xrightarrow[\text{NEWTON}]{} \hat{E}_i \longrightarrow E_i = \hat{E}_i \beta$$